2010 ANNUAL REPORT to CONGRESS

Department of Defense Chemical and Biological Defense Program

May 2010

I am pleased to present the Department of Defense (DoD) Joint Chemical and Biological Defense Program's (CBDP) 2010 Annual Report to Congress. This report outlines the progress made by the Program over the last year to protect our nation and its allies from current and emerging threats posed by weapons of mass destruction (WMD). The report also reviews current programs that provide Warfighters with superior chemical and biological (CB) defense training, equipment, education, and preparedness to ultimately achieve the CBDP's vision of ensuring that DoD operations can be executed successfully without constraint from chemical, biological, radiological, and nuclear (CBRN) effects. This year's report follows a streamlined format developed to deliver efficient messages and updates on the CBDP. Information regarding specific quantities, characteristics, and capabilities of fielded CB defense equipment are available in the *2009 CBDP Research, Development, and Acquisition Plan*.

The CBDP partners with Congress, other federal agencies, academia, international partners, and the private sector to fulfill its mission to provide CBRN defense capabilities in support of the National Military Strategies. This mission is supported by our immediate objective of providing integrated, coordinated, and sustainable solutions to the Warfighter and our continuing goal of advancing our defense capabilities to enhance preparedness and resources for both current and emerging WMD threats. We have structured our mission to be progressive, innovative, and responsive to the Warfighter and national security needs while sharpening program leadership, authority, and accountability.

During the last year, the CBDP has:

- Fielded advanced detection and protective systems and more than 1,000,000 pieces of equipment to the Services across the globe
- Implemented steps to assess and mitigate risks associated with emerging CBRN threats, including analysis of non-traditional agents and the expansion of the Transformational Medical Technologies Initiative
- Coordinated with international and interagency partners to facilitate operational collaboration between U.S. allies and to maximize CBDP capabilities
- Improved and augmented program management methodologies to foster continuous process improvement and bring proven and innovative technologies to the Warfighter
- Updated the *Test and Evaluation (T&E) Infrastructure Investment Strategy*, which ensures that T&E investment strategies will align to address national priorities
- Completed the DoD CBRN Defense Doctrine, Training, Leadership, and Education Strategic Plan and Implementation Plan to enhance and streamline CBRN training and oversight, significantly advancing Warfighter training structure and effectiveness
- Developed a work plan with the Department of Homeland Security and the Environmental Protection Agency to implement the Memorandum of Understanding in the areas of Chemical Biological Defense
- Submitted an Emergency Use Authorization to the U.S. Food and Drug Administration (FDA) for the H1N1 Pandemic Influenza A Assay at the request of the U.S. Centers for Disease Control and Prevention (CDC), which was approved by the FDA and allows DoD's Joint Biological Agent Identification and Diagnostic System to be used to run the CDC's H1N1 test.

As the CBDP continues to develop and field additional defensive capabilities in anticipation of both current and emerging WMD threats, we depend on continued congressional support to sustain progress and successfully serve our nation, our allies, and our Warfighters both at home and abroad.

With support of the President, the Secretary of Defense, and Congress, the DoD will continue to develop and advance an integrated CBDP that remains effective and continues to support our nation and our Warfighters through military preparedness, operational success, and defense of our homeland.

Andrew Weber
Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs

Department of Defense Chemical Biological Defense Program

Annual Report to Congress 2010

Introduction

In 2009, the Office of the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs/Chemical and Biological Defense (OATSD(NCB/CB)) designated two significant focus areas to address emerging threats to Homeland Defense and Overseas Contingency Operations: Non-Traditional Agents (NTA) and the Transformational Medical Technologies Initiative (TMTI).

The Chemical and Biological Defense Program (CBDP) provides support and world-class capabilities enabling the U.S. Armed Forces to fight and win decisively in chemical, biological, radiological, and nuclear (CBRN) environments. Since Congress established the CBDP in 1994, the Program has been the essential component of the Department of Defense's (DoD) efforts to integrate chemical and biological (CB) defense activities. The CBDP supports a comprehensive strategic framework to improve CB defense preparedness, reduce risk to the Warfighter, and field the appropriate mix of capabilities for sustained military operations with minimum degradation of combat effectiveness attributed to current CBRN hazards and emerging threats.

Research, development, and acquisition (RDA) of CB defense equipment and capabilities is executed by the DoD as a Joint Service program in accordance with Title 50 United States Code (U.S.C.) 1522. The CBDP also addresses radiological and nuclear defense requirements; however, these activities are limited to specific types of radiation detection equipment, modeling and simulation (M&S) capabilities, and medical countermeasures (MCM) to treat the physiological effects of radiological and nuclear source material exposure. The 2010 CBDP Annual Report to Congress (ARC) provides an Enterprise-wide overview of the CBDP and is provided in accordance with Title 50 U.S.C. 1523. This report describes the progress made by the DoD to protect the Warfighter, the United States, and its allies from the recognized threat or actual use of weapons of mass destruction (WMD), and outlines achievements, initiatives, and innovations undertaken to identify and balance investment priorities against WMD-associated risks over time.

Statement Regarding CB Defense Programs Involving Human Subjects

Although the DoD conducted tests involving the exposure of human subjects to CB agents in the past, all such tests and programs have been halted and disbanded. Human biological agent testing ended on November 25, 1969, and human chemical agent testing ended on July 25, 1975. No humans have been used as test subjects of any CB agent tests since that time.

Threat and the Global Security Environment

In 2009, the OATSD(NCB/CB) designated two focus areas: NTA defensive research and the TMTI. Both of these areas address emerging threats that are significant to Homeland Defense and Overseas Contingency Operations.

Emerging Threats

Threats from advanced biological hazards and non-traditional chemical agents are more credible today due to the globalization of recent advances in life science programs that have been expanding at an alarming rate, making the prospects of a pandemic increasingly possible. The world has never been at more risk to WMD use by regional powers hostile to American interests, or to the widespread effects of disease-causing pathogens.

Technological advances, proliferation, and the rise of global terrorism increase and diversify the threat posed by WMDs. The U.S. Armed Forces will continue to face a significant and evolving challenge of CB weapons and the environments that they can create. Technological and information advances of the last 50 years have disseminated CBRN knowledge worldwide, and as a result, a range of CB agents are available to many non-state actors with a modicum of scientific skill. Breakthroughs in biological science facilitate the emergence of wholly novel biological threat agents, as well as the genetic modification of naturally occurring pathogens. Likewise, novel chemical compounds and new combinations of existing agents or materials have led to the emergence of new chemical warfare threat agents.

As a result of openly-shared dual-use scientific research or illicit transfer, the technology and knowledge needed to create traditional or novel CB weapons may be proliferating to both state and non-state actors. Furthermore, there is a potential for states with weapons programs to fail, putting the security of their weapons and weapon producing capabilities into question. Terrorists, therefore, may acquire CB agents through clandestine production, state sponsorship, or theft.

Non-Traditional Agents

Addressing NTAs is a central objective of the *National Strategy to Combat Weapons of Mass Destruction (NSCWMD)*, coordinated with the Executive Office of the President, DoD, and Department of Health and Human Services (DHHS). As technological advances continue to evolve the threat, our defensive capabilities must ensure that the Warfighter can operate effectively in contaminated environments. The U.S. Armed Forces must be able to detect, decontaminate, and defend against NTAs. To this end, the DoD is enhancing NTA detection, medical, decontamination, and protection capabilities. NTA research must address improved surface detection, air detection, and early warning systems; MCMs to mitigate emerging threat agent effects; optimized emerging threat decontamination efforts that provide greater ease of handling and use; and improved protection garments.

Transformational Medical Technologies Initiative

The TMTI is a vital part of the National Biodefense Strategy and the Integrated National Biodefense Medical Countermeasures Portfolio (INBDP), which is coordinated with the Executive Office of the President, DoD, and DHHS. The TMTI's active interagency participation is essential to the development and implementation of an effective biodefense capability for the nation.

The overarching goal of the TMTI is to provide a capability to respond to emerging and genetically engineered biological threats. Three key performance enablers providing proof-of-process are:

1. Development of platform technologies for rapid development of MCMs
2. Determination of the genetic sequences for pertinent threats against which to screen, identify, and characterize potential biodefense threats
3. Development of needed broad spectrum countermeasures for viral and intracellular bacterial pathogens (ICB).

The program will continue to meet congressional objectives by addressing additional categories of viral and bacterial pathogens and enhancing the capability to respond to emerging and genetically modified biological threats. TMTI investments have resulted in the only therapeutics for hemorrhagic fever viruses (HFV) to enter clinical trials from any U.S. Government agency.

Addressing emerging threats is a unique challenge because the threats are associated with catastrophic risks and are evolving rapidly. Significant knowledge, technology, and capability gaps exist in combating weapons of mass destruction (CWMD), and many resources needed to support this effort are finite and overextended.

Chemical Threat

The chemical weapon (CW) threat remains despite the decline in the number of countries with active chemical warfare programs in recent years and the decrease of Chemical Weapons Convention (CWC)-declared stockpiles. The number of countries capable of producing chemical agents has grown, and will continue to increase, due to the availability of chemical production equipment as a result of the globalization of the chemical industry. Corruption and lax enforcement of export controls in some countries may also contribute to developmental CW programs. As technology progresses and becomes increasingly available in a global environment, the threat could become more diverse and more technically sophisticated. Although many states may choose to remain focused on "traditional" chemical warfare agent (CWA) programs, others may be motivated to develop agents that are more difficult to detect, easier to disseminate, and have increased lethality.

The increased availability of related technologies, coupled with the relative ease of producing some chemical agents, has increased concern that their production and employment may become more attractive to states or terrorist groups. Additionally, both state and non-state actors may utilize non-weaponized chemicals, including toxic industrial chemicals (TIC) and toxic industrial materials (TIM), to achieve the same goals. TICs/TIMs are usually more readily available, and in some cases can produce the same lethal and incapacitating results as traditional CWAs.

Biological Threat

Biological warfare and bio-terrorism are expected to remain significant threats to the United States and its allies. Biological weapons (BW) are easier and cheaper to develop than nuclear weapons, and can have more wide-ranging and destructive impacts than CWs due to both difficulty to detect and the ability of some biological pathogens to be transmitted to others. As a result, state and non-state actors may continue to view BWs as valuable tools.

Over the next decade, the BW threat is likely to become more complex because of increased agent variety, sophistication, and feasibility of *in vitro* genetic modification. Although Anthrax will remain an attractive option for many state programs, some state and non-state actors may focus on new types of viral and bacterial agents. The availability of BW-related technology, materials, information, and expertise has increased, as has publicity about potential vulnerabilities. Genetic engineering and other advances in bio-technology provide groups intent on developing BW with powerful capabilities to modify virtually any biological agent, affecting characteristics such as enhanced agent virulence, increased environmental stability, resistance to MCMs, and defeat of physical barriers and bio-detectors.

The dual-use nature of many BW-related technologies provides apparent legitimacy for their manufacture and purchase. It also makes it extremely difficult to differentiate, with a high level of confidence, offensive BW programs from legitimate commercial, public health, and defensive activities.

Despite the fact that traditional weaponization and delivery of biological agents are more difficult than popular literature may suggest, even the potential use of biological agents with crude delivery systems, such as the Anthrax letters in the United States in 2001, could have significant operational repercussions for military forces and could cause serious casualties and disruption to civilian, agricultural, or economic targets.

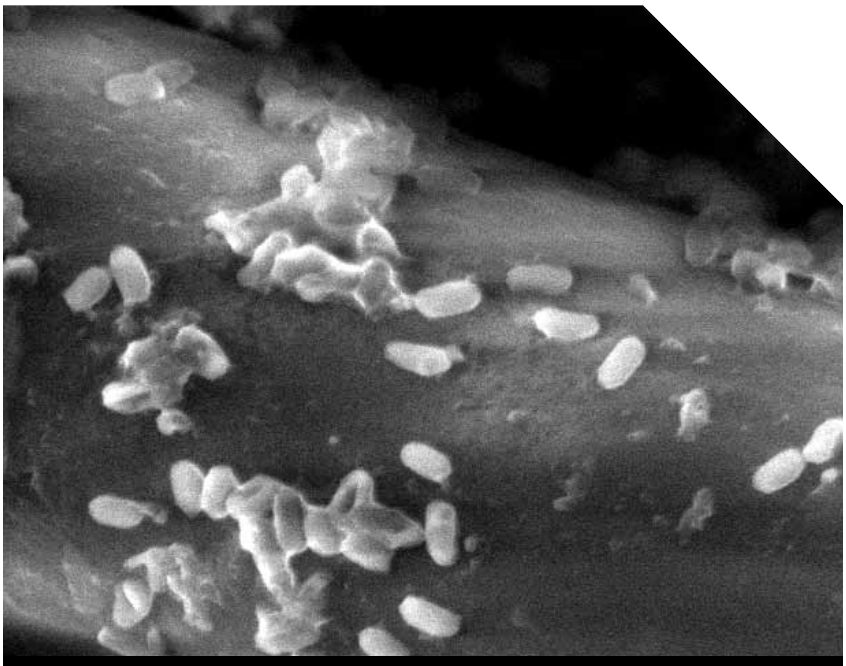
It is also worth noting that an individual could serve as a delivery system for some contagious threat agents in either civilian or military populations. These scenarios would involve dissemination by an individual (either a volunteer or an unwitting person) of a disease that could be spread rapidly from human to human. Under certain circumstances, several infected individuals could widely disseminate a disease before symptoms would be apparent. The success of such a scenario would depend on a number of factors such as access to a suitable disease, timing of exposure, and the vulnerability of a target population.

While there are no simple solutions to the threat of biological weapons, a combination of expansion of U.S. national expertise and international partnerships can leverage resources and create synergies in detecting and deterring threats. The situational awareness needed for a global pandemic, for instance, overlaps with that needed to detect a major bioterrorist campaign. In this area, the enemy has to win only once to achieve their goals; we have to win every time to protect our nation and its interests.

Nuclear and Radiological Threat

Although the United States continues to reduce the number of nuclear weapons in its stockpile in accordance with Article VI of the Non-Proliferation Treaty, the number of nuclear weapons in many countries is increasing; in others, the number of nuclear weapons remains a closely guarded secret. The Democratic People's Republic of Korea, India, and Pakistan are building larger stockpiles of fissionable material and are working on advanced warhead and delivery system designs to increase the effectiveness of these weapons. Russia and China are modernizing nuclear weapon designs and strategic delivery systems. The Defense Intelligence Agency assesses with moderate-to-high confidence that Iran is, at a minimum, keeping open the option to develop nuclear weapons.

Stockpiles of radioactive materials, particularly americium, cesium, cobalt, iridium, plutonium, and strontium from nuclear weapon and nuclear power programs can be found at hundreds of sites in more than 40 countries. Of great concern are the many unsecured high-risk sources, such as the 700 radioisotope thermoelectric generators which are operational or abandoned in Russia. These types of sealed sources are easily transportable, and therefore extremely vulnerable to either theft or sale to terrorist groups. Increased availability of radiological material enables even technically limited terrorist groups to create a radiological dispersal device ("dirty bomb") or a radiological exposure device with ease; these weapons are designed to spread radioactive contamination or expose personnel to radioactive material without a nuclear detonation. Such devices will not cause mass casualties, but they could cause damaging amounts of social and economic disruption. Additionally, a highly sophisticated terrorist group could build or acquire an improvised nuclear device creating a nuclear yield. Thus, a terrorist attack using radiological materials continues to pose a valid threat to the United States.



Bacillus anthracis spores.

Vision and Mission

The CBDP vision and mission, or "ends," are supported by four overarching and interrelated goals based on the major defense challenges described in the current National Military Strategies.

The CBDP supports the nation's overall strategy for countering the effects of WMD use against U.S. interests and allies. The CBDP supports the development of capabilities required across many tasks shared among passive defense, consequence management, interdiction, and elimination operations. The CBDP also supports multiple national strategies that address the strategic environment for deterring and preventing adversary use of WMD. Specifically, the CBDP supports the *NSCWMD*, which emphasizes that the gravest danger for the United States lies at the crossroads of radicalism and technology. The *2008 CBDP Strategic Plan* leverages key elements drawn from multiple strategic plans both internal and external to the CBDP. Relevant documents are listed below:

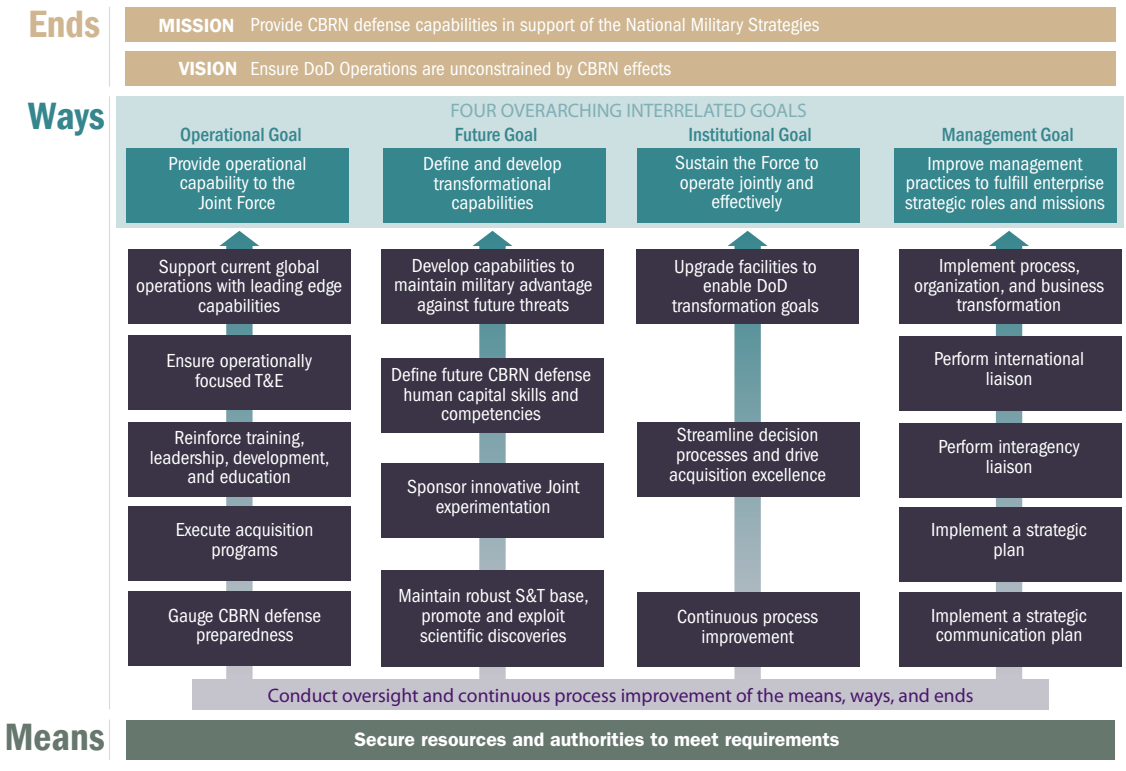
- *NSCWMD*
- *National Military Strategy to Combat Weapons of Mass Destruction (NMSCWMD)*
- DoD Strategy for Homeland Defense and Civil Support
- 2008 Chairman, Joint Chiefs of Staff's (CJCS) Posture Statement
- *2006 and 2010 Quadrennial Defense Reviews (QDR)*
- Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) Implementation Plan.

The CBDP also supports the MCM planning and alignment required by Homeland Security Presidential Directive (HSPD) 18, *Medical Countermeasures against Weapons of Mass Destruction* (HSPD-18), and the vertical and horizontal coordination echoed in HSPD-21, *National Strategy for Public Health and Medical Preparedness*.

The overall vision of the CBDP, as stated in the *2008 CBDP Strategic Plan*, is to ensure that DoD operations are unconstrained by current and future CBRN effects. The mission of the CBDP is to provide CB defense capabilities in support of the National Military Strategies. The CBDP vision and mission, or "ends," are supported by four overarching and interrelated goals based on the major defense challenges described in the current National Military Strategies. These goals combine to provide the essential integrated, coordinated, and sustainable CBRN materiel and non-materiel solutions to the Warfighter. The four strategic goals are supported by 17 strategic priorities, or "ways." The "means" represent the resources and methods employed to execute the strategies. The CBDP strategy map is illustrated in the figure below.

The overall vision of the CBDP, as stated in the *2008 CBDP Strategic Plan*, is to ensure that DoD operations are unconstrained by current and future CBRN effects. The mission of the CBDP is to provide CBRN defense capabilities in support of the National Military Strategies.

CBDP Strategy Map



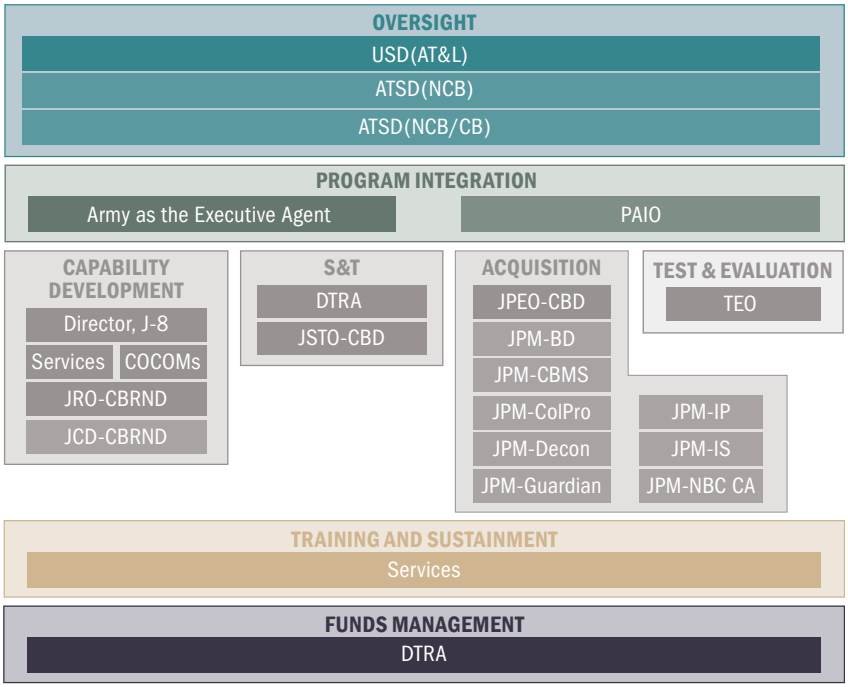
Key Organizational Relationships, Roles, and Responsibilities

In accordance with Title 50 U.S.C. 1522, oversight of the CBDP is assigned to a single office within the Office of the Secretary of Defense (OSD) — the OATSD(NCB/CB).

Responsibilities within the CBDP are executed in accordance with Department of Defense Directive (DoDD) 5160.05E, *Roles and Responsibilities Associated with the CBDP*. DoDD 5160.05E updates and assigns responsibilities and functions associated with the RDA of chemical, biological, and radiological CBRN defense materiel (medical defense and physical (non-medical) defense) required to support CWMD missions as set forth in the *National Military Strategy of the United States of America* and DoDD 2060.02, *DoD CWMD Policy*. DoDD 5160.05E also designates and defines the role of the Secretary of the Army as the DoD Executive Agent for the CBDP — pursuant to section 1522 of Title 50 U.S.C., and in accordance with DoDD 5101.1, *DoD Executive Agent*.

The CBDP recognizes that integration is the key to achieving the best efficiencies and effectiveness. The CBDP Enterprise is organized to focus on policy and governance, planning and programming, military capability development, science and technology (S&T), advanced development and acquisition, test and evaluation (T&E), and doctrine. Organizational relationships are established to ensure single decision authorities, effective coordination, integration of program efforts, and appropriate checks and balances. Roles and responsibilities of the primary offices supporting the CBDP are described in the table on the following page and are represented in the "CBDP Enterprise Organizational Roles and Responsibilities" figure.

CBDP Enterprise Organizational Roles and Responsibilities



U.S. Marines with the Chemical Biological Incident Response Force (CBIRF), II Marine Expeditionary Force (MEF) conduct a search, extraction, and decontamination exercise during SUDDEN RESPONSE 09 at Camp Blanding, FL. (U.S. Air Force photo by Tech. Sgt. Dennis J. Henry)

Oversight

- **USD(AT&L):** Serves as the Principal Staff Assistant and advisor to the Secretary of Defense for all RDA matters relating to CBRN defense; exercises authority, direction, and control over the ATSD(NCB); and oversees DoD RDA programs to ensure that they support CWMD policy efforts. The USD(AT&L) is the milestone decision authority (MDA) for the overall CBDP and key selected CB defense systems.
- **Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD(NCB)):** Coordinates and integrates the CBDP as a single responsible office within the OSD and executes program oversight activities, related acquisition policy guidance, and interagency and international coordination. The ATSD(NCB) also provides oversight of funds allocation for CBDP defense-wide accounts.
- **OATSD(NCB/CB):** Responsible for overall coordination and integration of all CBDP activities and provides day-to-day oversight of the program.

Program Integration

- **Army as the Executive Agent:** Serves as the MDA for CBRN defense programs as delegated by the USD(AT&L). Coordinates and integrates the Services' research, development, test, and evaluation (RDT&E) and acquisition requirements for DoD CBRN defense programs. Also reviews all CBDP funding requirements.
- **CBRN Defense Program Analysis and Integration Office (PAIO):** Provides independent analysis and integration functions for the CBDP. Supports the Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense (JRO-CBRND)-led development of the CBDP Program Objective Memorandum (POM) and leads the development of budget submissions and change proposals. Also develops and maintains the CBDP RDA Plan.

Capability Development

- **Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense (JRO-CBRND):** Coordinates and integrates requirements and capability needs for all DoD CBRN defense programs, ensuring that Service and Combatant Command/Combatant Commander capability needs are promptly developed and approved. Also leads development of the CBDP POM Strategy, and supports the development of multi-Service and Joint CBRN defense doctrine; tactics, techniques, and procedures (TTP); and training.
- **Joint Combat Developer for Experimentation for Chemical, Biological, Radiological, and Nuclear Defense (JCD-CBRND):** Under the direction of the JRO-CBRND, coordinates and oversees Joint and multi-Service experiments used to validate the Joint integrating concept for CWMD by systematically exploring new and innovative combinations of medical and physical doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) capabilities. Located at the U.S. Army Maneuver Support Center (USAMANSCEN) in Fort Leonard Wood, MO, the JCD-CBRND leverages personnel, equipment, and facilities available through each Service and other government organizations to reduce costs, shorten timelines, and improve experimental designs.
- **The Services** validate operational concepts and develop Service-sponsored CBRN defense capabilities documentation consistent with the Joint Capabilities Integration and Development System (JCIDS) process and the Joint CBRN Defense Modernization Plan. In addition, they support the development of Service annexes to Joint CBRN defense capability documents, as appropriate. The Services also identify and provide CBRN defense capability needs and priorities to the JRO-CBRND.

Science & Technology

- **Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD)/Defense Threat Reduction Agency (DTRA):** Manages CBDP S&T efforts in coordination with the Service laboratories, industry, academia, other government agencies (OGA), and laboratories. The JSTO-CBD develops and maintains CBDP medical and physical sciences S&T plans and develops, coordinates, and transitions CBDP S&T medical and physical sciences technologies and associated CBDP T&E technology needs in response to validated and approved Joint military capability needs. The JSTO-CBD also manages the CBDP advanced concept technology demonstration (ACTD), advanced technology demonstration (ATD), and Joint capability technology demonstration (JCTD) processes and individual ACTDs/JCTDs as assigned by the USD(AT&L).

Test & Evaluation

- **T&E Executive:** Establishes test standards, processes, and procedures and oversees CBDP T&E infrastructure to ensure that adequate T&E is conducted for CBDP systems.

Acquisition

- **Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD):** Serves as the MDA for CB defense programs as delegated by the DoD Executive Agent for the CBDP. Provides centralized program management and Joint Service acquisition program integration for all assigned medical and physical programs. The JPEO-CBD has eight Joint Project Managers (JPM) that execute acquisition programs: JPM for Biological Defense (JPM-BD), JPM for Chemical and Biological Medical Systems (JPM-CBMS), JPM for Collective Protection (JPM-ColPro), JPM for Decontamination (JPM-Decon), JPM for Installation Force Protection (JPM-Guardian), JPM for Individual Protection (JPM-IP), JPM for Information Systems (JPM-IS), and JPM Nuclear, Biological, and Chemical Contamination Avoidance (JPM-NBC CA). These JPMs direct RDA, procurement, fielding, and life cycle support of CB defense equipment and MCMs.

Training and Sustainment

- **The Military Departments** organize, train, equip and prepare their respective forces to combat WMD and provide a means of delivery of related materials. They provide CBRN defense training, readiness, and sustainment for their respective departments. They also budget for operations and sustainment (O&S) of CBRN defense equipment.

Funds Management

- **DTRA:** Serves as the certifying official, providing funds management functions for the CBDP under the direction and oversight of the Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense and Chemical Demilitarization (DATSD(CBD/CD)).

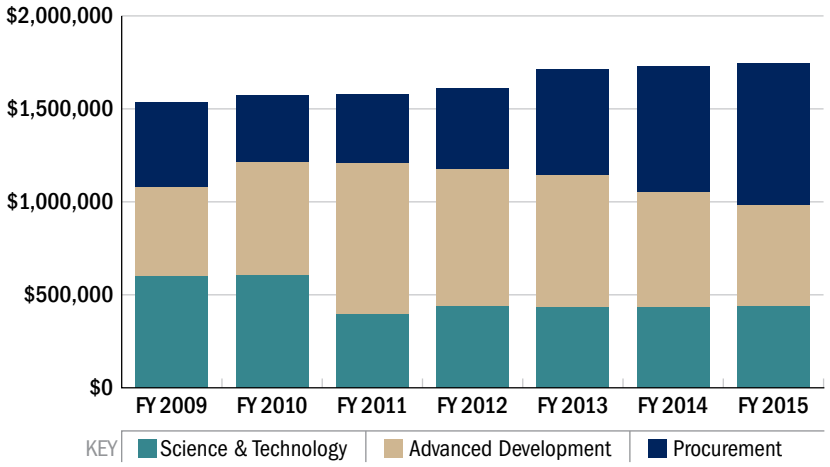
Funding

In order to support the ability of the CBDP to respond dynamically to shifting threats, adequate funding and resources must be provided to address operational capability gaps — such as procurement and fielding, advanced S&T, RDT&E, and the new Force-sizing construct — and achieve modernization objectives. The CBDP budget is set forth as a separate DoD account, with a single program element for each category of RDT&E, acquisition, and military construction. Funding is apportioned between levels of research, development, and procurement to balance technology transitions, development and test schedules, production capabilities, and Warfighter priorities.

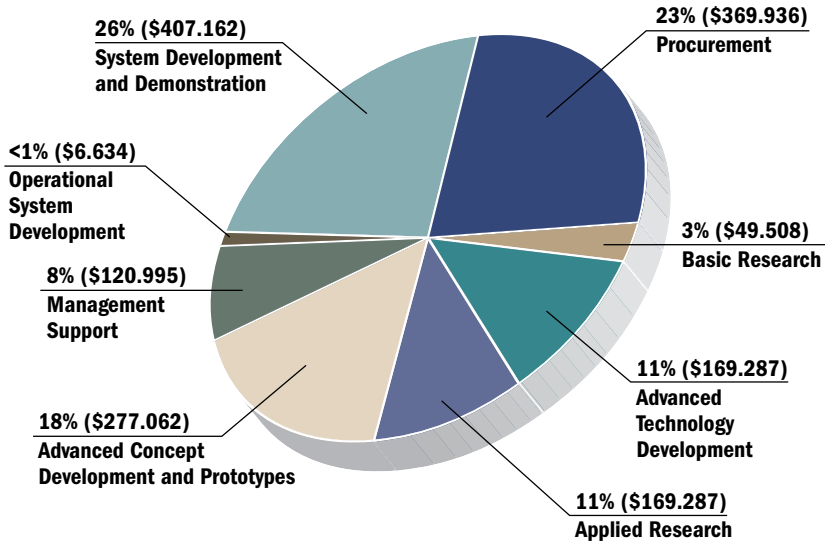
To continue to address both current and emerging CBRN threats and to gain a competitive advantage for the U.S. Armed Forces to fight and win in a CBRN environment, congressional support for the CBDP's FY 2011 President's Budget (PB) Request is essential to sustain progress and meet the critical operational needs of Warfighters and homeland defense requirements.

Full operational capability and O&S funding for CBRN defense materiel is not consolidated at the DoD level. The Military Departments are responsible for separately funding the equipment procurement (i.e., Joint CB Coverall for Combat Vehicle Crewman (JC3)) delta between the Approved Acquisition Objective and the number Joint funded. Additionally, replenishment and sustainment of CBRN defense secondary equipment items (e.g., consumables such as decontamination kits, detection kits, and filters) are the responsibility of the Services. Depot maintenance and contractor logistics support for some low-density major items are also O&S-funded, and therefore not included in the Joint CBDP budget. The figure at the top right shows the CBDP Appropriated values for FY 2009 through FY 2010 and the President's Budget request for FY 2011 separated into procurement, advanced development and S&T funds. The pie chart gives a further breakdown of the FY 2011 President's Budget request.

CBDP President's Budget Request FY 2009 - FY 2015



CBDP FY 2011 Resource Allocation



Total Funding FY 2011: $1.578 Billion

KEY $=Figures in Millions

Management Assessment

In 2009, the CBDP began to implement fully the guidance set out in two key documents from 2008. DoDD 5160.05E *Roles and Responsibilities Associated with the Chemical and Biological Defense (CBD) Program (CBDP)*, October 9, 2008, serves as the foundation for oversight in the CBDP. This important guiding directive, an update to the original 1985 version, addresses CBDP policy, roles, and responsibilities for RDA activities. To fully implement the policies and responsibilities established in DoDD 5160.05E, the CBDP has developed a DoD Instruction (DoDI), currently in final staffing, that will codify procedures for the oversight, management, reporting, and development of CBDP strategy; planning, programming, budget, and execution (PPBE); capability development, and RDA. The *CBDP Strategic Plan*, published on September 30, 2008, is intended to influence ongoing near- and mid-term actions and provides the direction for the next 10 to 15 years. This strategy portrays the first comprehensive, integrated roadmap for the CBDP Enterprise by outlining the overarching direction for the organization. Components of the CBDP Enterprise have begun to build supporting strategic plans based on the goals and objectives established in this overarching strategic framework document.

The CBDP is currently pursuing an Investment Assessment Process (IAP) that will put actionable metrics in place to help the ATSD(NCB/CB) achieve Enterprise-wide transparency and to better inform decision making. IAP reflects ongoing DoD and administration acquisition objectives that will set high-priority goals supported by meaningful measures and quantitative targets, emphasize reporting and explaining trends, streamline reporting requirements to reduce administrative burden, and publish and communicate results. Assessments will be integrated, coordinated, and representative of all CBDP Component responsibilities. Efforts are currently ongoing to determine the required metrics with implementation anticipated in FY 2010.

The ATSD(NCB/CB) is currently employing a Preparedness Assessment methodology to assess the preparedness of DoD CBRN defense, thus satisfying the intent of Congress as mandated by Title 50, U.S.C. sections 1522 and 1523, January 8, 2008. The Preparedness Assessment methodology, prepared by the PAIO in accordance with the FY 2008 to 2013 Program Strategy Guidance, outlines the processes to assess the overall Joint CBRN defense preparedness posture. This methodology is repeatable, verifiable, and quantifiable by leveraging the processes used by the Services and the CBDP to assess preparedness. This process presents an integrated CBDP preparedness picture by using existing data sources (including the Defense Readiness Reporting System (DRRS), Joint Acquisition Chemical, Biological, Radiological, and Nuclear Knowledge System (JACKS) Reporting Warehouse (JACKS-RW), and JCIDS). This process displays inputs and metrics of the collected data that will lead to a reliable assessment tool for CBRN leadership.

The DoD CBRN Defense Doctrine, Training, Leadership, and Education (DTL&E) Strategic Plan, signed on December 5, 2008, was developed through continuous facilitation, coordination, and synchronization of existing oversight processes including assessing feedback, analyzing improvement processes to monitor results, and identifying areas requiring additional emphasis.

The DoD CBRN Defense DTL&E Implementation Plan with Oversight Matrix was signed on May 8, 2009. The implementation plan provides a goal-centric oversight matrix with priorities that produce measurable results. It identifies key near-, mid-, and far-term changes; initiatives and projects; milestones; short-, mid-, and far-term accountable actions; and metrics that support the DoD CBRN Defense DTL&E Strategic Plan. The plan focuses on the Warfighter's identified capability gaps while understanding the CBRN defense implications and, where possible, incorporates other governmental and departmental education and training initiatives to meet national and military strategies. It also requires stakeholders to identify opportunities to participate in interagency activities for homeland defense and increase opportunities for combined education, exercises, training, and experimentation in support of homeland security initiatives.

DoDI 3150.09, *The Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy*, was updated on August 17, 2009. This instruction directs the ATSD(NCB/CB) to oversee and coordinate the execution of DoD CBRN Survivability Policy. This latest revision transferred the responsibility to act as OSD principal staff assistant for overseeing implementation of DoD CBRN Survivability Policy for command, control, communications, and computer systems from the Under Secretary of Defense for Intelligence to the Assistant Secretary of Defense Networks and Information Integration/ DoD Chief Information Officer. This instruction creates a reporting system where the Services and the Missile Defense Agency submit CBRN Mission Critical Reports on December 31st of each year to the CJCS and the ATSD(NCB/CB) via the Select and Native Programming (SNaP) Data Input System. The SNaP, operated by the Office of the Director, Cost Assessment and Program Evaluation, collects these Mission Critical Reports via the Secure Internet Protocol Router Network. Two groups review these reports' proposed corrective actions and verify that they meet DoDI 3150.09 requirements. One group is led by the Deputy Assistant to the Secretary of Defense for Nuclear Matters to review nuclear survivability issues, and one is led by the DATSD(CBD/CD) to review CBR-related issues. These two groups identify cross-cutting issues for the CBRN Survivability Oversight Group, charged with reviewing and monitoring the execution of the DoD CBRN Survivability Policy.

The CBDP International Oversight Panel (IOP) currently provides integration and oversight in the international arena for the CBDP. The IOP was established in FY 2007, and the charter has undergone review and revision. The Australia, Canada, United Kingdom, and the United States (AUS/CAN/UK/US) Memorandum of Understanding on Research, Development, and Acquisition of Chemical, Biological, and Radiological Defence Materiel (CBR MOU) is a long-standing agreement and must be reviewed every six months. A symposium with all participants has been completed. The CBDP has revised the CBR MOU strategy and roadmap to the year 2025, which enhances cooperative efforts to populate the matrix of member countries' capabilities, align national priorities to the maximum extent possible, and identify resulting gaps. The Program has developed new procedures for the completion of the CBR MOU for equipment and materiel transfer.

The Management area is assessed based on the status of DoD Issuances, Strategy and Guidance, and Methodologies, as shown in the table below. Ratings were assigned to each document based on the following:

- Green: Document is complete or was completed during FY 2009
- Yellow: Document was not completed during FY 2009 and/or the document is experiencing delays
- Red: Document was not completed during FY 2009 and is experiencing significant issues and/or delays.

Management Assessment Documents

	Management Initiative Ratings	Rationale
DoD Issuances	DoDD 5160.05E	Complete
	DoDI 3150.09	Complete
	DoDI 5160.xx	In progress, scheduled for completion third quarter of FY 2010.
Strategy & Guidance	CBDP Strategic Plan	Complete
	Procedures for CBR MOU for Equipment and Materiel Transfer	Complete
	CBR MOU Strategy and Roadmap	Complete
	DTL&E Strategic Plan	Complete. Implementation effort ongoing.
	Preparedness Assessment Methodology	Complete. Implementation effort ongoing.
Methodologies	IAP Process	Effort ongoing. Implementation scheduled for second quarter FY 2010.

Overall Program Assessment

The following provides a review of the overall state of the CBDP. This assessment captures program-wide successes and issues impacting the CBDP's overall health across Capability Development, S&T, Acquisition and Logistics, T&E, DTL&E, and Management.

Detailed assessments for each of these areas are presented in their respective sections in the ARC. These assessments use existing DoD CBDP processes and leverage existing metrics and data to the greatest extent possible. The evaluation process summarizes and integrates information of record from numerous data sources, and the results are verifiable by internal and external organizations and agencies, where applicable. The assessment supports OATSD(NCB/CB) efforts to accurately assess CBDP health and progress and summarizes Program status, overall CBDP performance, and cross-cutting and significant issues in FY 2009.

Each category assesses metrics based on the following criteria:

- Green: No cross-cutting issues
- Yellow: Cross-cutting issues with identified resolution within established processes
- Red: Critical issues that require General Officer/Flag Officer (GO/FO) resolution.

The following provides a brief overview of each section and their respective assessment rating:

- Management is assessed as green/yellow. This rating is based on a review of nine management documents and efforts, of which seven are green and two are yellow.
- Capability Development is assessed as green. This rating is based on a review of 55 FY 2008 JRO-CBRND JCIDS documents, of which 51 (or 93 percent) are green.
- S&T is assessed as green. This rating is based on the 2009 CB Defense S&T Review of cost, schedule, and performance of Program portfolios. More than 60 programs, covering the entire spectrum of CB Defense S&T Research, have been approved for continued funding in FY 2010.
- Acquisition and Logistics is assessed as green. This assessment is based on the JPEO-CBD's review of cost, schedule, and performance of the acquisition programs currently under the oversight of the Defense Acquisition Executive. Overall success of the acquisition programs is measured in terms of fielding additional or new capabilities to the Warfighter.
- T&E is assessed as green/yellow. Improvements were made in FY 2009 with key CB defense T&E capabilities coming online. The T&E Executive has developed a fully integrated and coordinated T&E plan that is consistent with the Test Resource Management Center (TRMC) Strategic Plan. This effort aids the CBDP in keeping its T&E infrastructure up to date and aligned with national priorities to support testing needs.

When averaged together, the above assessments produce an overall rating for the CBDP program of green/yellow, as shown in the graphic.

The CBDP requires support from Congress to ensure continued progress in developing and fielding capabilities to protect the U.S. Armed Forces against current and emerging CBRN threats and to meet critical ongoing operational needs to fill current, near-, and far-term capability gaps in the CBDP in the following areas:

- Sufficient resources to ensure procurement and fielding of improved defensive capabilities essential to the U.S. Armed Forces' ability to operate in any environment, unconstrained by the effects of WMD or CBRN contamination.
- Steady funding to exploit fully the advanced S&T innovations necessary to counter current and future CB weapons successfully.
- Adequate long-term investment in infrastructure to enhance RDT&E capabilities, including modernization and construction of laboratories and test facilities to ensure timely development of advanced countermeasures against current and emerging CBRN threats.
- Improvements in Joint DTL&E management and oversight, which lay the foundation to more thoroughly prepare our Warfighters to counter and mitigate CBRN threats in any environment.

The CBDP is striving to develop innovative technologies against a diverse, perpetually evolving range of threats and reduce the impact of CB defense equipment on the Warfighter through better integration with standard military hardware and more rigorous evaluation of technology prior to transition from S&T to acquisition.

Overall Program Assessment

Assessment Area	Assessment
Management	
Capability Development	
S&T	
Acquisition and Logistics	
T&E	

Overall Program Assessment

Air Force Emergency Manager approaching Ahura FirstDefender during Training.

Chemical and Biological Defense Program Capability Development Process

The CBDP utilizes the DoD's Force Planning Construct (FPC) as the foundation for the identification and analysis of required capabilities to ensure that operations are unconstrained by CBRN effects.

The CBDP's first step in enabling the Warfighter to operate successfully in CBRN environments is to develop the proper mix of Joint capabilities for current military operations, while also preparing against emerging threats. As emphasized in the 2008 National Defense Strategy, countering asymmetric threats from prospective adversaries calls for better and more diverse capabilities—the CBDP is leading the way in defining and meeting these needs.

The CBDP is actively participating in the 2010 *QDR* process and will align with any FPC changes. To establish the CBRN defense capabilities needed to support the National Military Strategies, the JRO-CBRND partners with the Services and Combatant Command authorities to link programs to support the DoD's FPC. These missions include traditional combat, homeland defense, civil support, installation protection, and consequence management, as well as special operations, counterterrorism, and security. The CBDP utilizes the DoD's FPC as the foundation for the identification and analysis of required capabilities to ensure that operations are unconstrained by CBRN effects.

The JRO-CBRND also incorporates other CBRN defense-specific plans that help shape capability development, such as the CBRN Overarching Operational Concept and the CBRN Defense Modernization Plan. The JRO-CBRND identifies future operational capability needs with input from the Services, the Joint Staff-led Joint Warfighting Capability Assessments, and Combatant Commands. This cooperation ensures that the DoD fields the proper mix of capabilities to enable military operations and constitutes the front-end analysis required to begin capability generation. The output of this analysis is the Joint Priority List (JPL), which identifies and prioritizes CBRND core capabilities across each of the core capability areas.

After establishing capability goals as outlined in the CBDP mission and vision, the Program defines objectives to deliver these capabilities to the Warfighter. The J-8/JRO-CBRND works with the CJCS to represent the Services and Combatant Commands in the JCIDS, and acts as their advocate for coordinating and integrating CBRN defense-approved operational capabilities. These organizations also manage the CBRN defense capabilities document approval process, which includes approving Service/Combatant Command-validated Joint capabilities documents and Service/Combatant Command-specific approved annexes, as per the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01, JCIDS, and Joint Requirements Oversight Council (JROC) Memorandum 163-02.

INITIATIVES

- The ATSD(NCB) initiated efforts to field viable NTA CW defense solutions to the Joint Force. The JRO-CBRND, in collaboration with the JPEO-CBD and JSTO-CBD, initiated a NTA defense technology demonstration and fielding program to rapidly equip Warfighters with improved NTA defense equipment. The program's goal is to improve military readiness to defend against emerging chemical threats by the first quarter of FY 2011. Following successful initial fielding to a designated unit, efforts will continue to improve NTA defense capabilities across the Joint Force.
- Last year, the JRO-CBRND initiated the CWMD Passive Defense Capabilities Based Assessment (CBA) to review and update the December 2005 CBRN Defense CBA. The goal of the update is to revalidate, revise, and identify the DoD CWMD Passive Defense capabilities needed to accomplish the Military Strategic Objectives, as well as the gaps within and solution approaches to satisfying these needs. The gap analysis identified 52 gaps in the DoD's passive defense capabilities, and the solutions analysis recommended 175 materiel and non-materiel approaches to resolving these gaps. The CWMD Passive Defense CBA is expected to be completed in FY 2010.

ACCOMPLISHMENTS

- The JRO-CBRND updated the JPL, which, based upon inputs from the Services and Combatant Commands, provides a prioritized list of the 29 core CBRN defense capabilities required to achieve the Military Strategic Objectives within the passive defense, WMD consequence management, elimination, and interdiction mission areas. Completed in October 2009, the updated JPL helps guide development of the FY 2012 - 2017 POM for the CBDP and provides analytical rigor for a Future Years Defense Plan budget of approximately $13B.
- The JRO-CBRND distributed the concept of operations (CONOPS) for Joint CBRN Contamination Mitigation, which describes how the Joint Force will conduct mitigation of hazardous contamination in support of military operations in the 2016 - 2028 timeframe. The concept informs the DoD S&T and capability development processes.
- The Director, JRO-CBRND approved and validated the Joint Service Transportable Decontamination System-Small Scale (JSTDS-SS) Capability Production Document (CPD).
- The JRO-CBRND obtained JROC approval for an Initial Capabilities Document (ICD) for the CBRN Uniform Integrated Protection Ensemble. This ICD supports the development of the next generation of individual protection equipment, with the objective of developing individual protection material solutions that establish and maintain the lowest possible operational protective postures, promoting reduced performance degradation and minimizing physical encumbrances while minimizing the risk of exposure or contamination.
- The Joint Capability Board approved the Joint Medical Chemical, Radiological, and Nuclear ICD.

Core Capability Areas

1. Chemical stand-off detection (SENSE)
2. Chemical point detection (SENSE)
3. Biological point detection (SENSE)
4. Biological stand-off detection (SENSE)
5. Integrated early warning (SHAPE)
6. Field analytics (SENSE)
7. CBRN reconnaissance (SENSE)
8. Biological prophylaxis (SHIELD)
9. Respiratory and ocular protection (SHIELD)
10. Radiological stand-off detection (SENSE)
11. Personnel contamination mitigation (SUSTAIN)
12. Percutaneous protection (SHIELD)
13. Radiological point detection (SENSE)
14. Equipment contamination mitigation (SUSTAIN)
15. Chemical prophylaxis (SHIELD)
16. Medical surveillance (SHAPE)
17. Battle or operating environment management systems (SHAPE)
18. Biological therapeutics (SUSTAIN)
19. Medical diagnosis (SENSE)
20. Battle or operating environment analysis (SHAPE)
21. Chemical therapeutics (SUSTAIN)
22. Radiological prophylaxis (SHIELD)
23. Radiological therapeutics (SUSTAIN)
24. Expeditionary collective protection (ColPro) (SHIELD)
25. Fixed-site ColPro (SHIELD)
26. Fixed-site contamination mitigation (SUSTAIN)
27. Methods of control (SHAPE)
28. Hazardous waste control (SUSTAIN)
29. Remains disposition (SUSTAIN)

Validation and Approval Process

The validation and approval process for CBDP capabilities follows the policies and principles set forth in the DoD 5000 series for the Defense Acquisition System. Operational capability needs are filled as the JRO-CBRND coordinates with the Services and Combatant Commands through CBAs, Joint Operating Concepts, Joint Functional Concepts, Joint Capability Areas, and Joint Integrating Concepts. CBAs consider solutions across the DOTMLPF spectrum to determine the best combination of materiel and/or non-materiel solutions to fill the capability gap. Should a materiel solution be identified, the JRO-CBRND, in coordination with the Services, develops capability documents for staffing and approval in accordance with the JCIDS process. Non-materiel solutions are addressed in the DTL&E Section of this report.

Joint Capabilities and Integration Development System Process

Approved and validated CBDP capabilities are further defined, prioritized, assessed, and met through the JCIDS process described in CJCSI 3170.01G. The JCIDS process is initiated by the CBA process to identify gaps and prioritize the gaps requiring action. If materiel solutions are pursued, the results of the CBA are documented with an ICD. For non-materiel solutions, results of the CBA are also documented with a joint DOTMLPF Change Recommendation. When the JROC approves an ICD, it validates the capabilities required to perform the mission as defined, the gaps in capabilities and their associated priorities and operational risks, and the need to address the capability gaps. When a materiel solution is required by an approved ICD, the MDA determines the scope of the subsequent analysis of alternatives (AoA). The ICD, along with the results of the AoA, form the basis to assess potential materiel solutions for an acquisition decision.

INITIATIVES

The finalized March 1, 2009 iteration of CJCSI 3170.01G identifies numerous changes to the capability development process based on lessons learned and JROC direction and approval:

- Establishes the Joint Capabilities Board (JCB) Interest Joint Potential Designator (JPD). The JPD is essential to the JCIDS document review, validation, and approval process. The staffing process prepares the document for review by the lead Functional Capabilities Board and validation and approval by the appropriate authority. The JPD determines whether proposals affect the Joint Force, as designated by Joint Staff J-8. There are five JPDs: JROC, JCB, Joint Integration, Joint Information, and Independent.
- Provides updated guidance on the execution of CBAs to achieve a more streamlined process focused on meeting the JROC's direction to rapidly validate capability gaps.
- Deletes the Joint Capabilities Document as an option resulting from a CBA. The function of the document has been incorporated into the ICD.

Capability Refinement

In FY 2008, the JRO-CBRND initiated the CWMD Passive Defense CBA to identify, document, and update, as required, the passive defense capability needs identified in the 2005 CBRN Defense CBA. The objectives of the update were to:

- Identify the DoD's near- (2009 - 2014) and far- (2015 - 2027) term CBRN passive defense capabilities, gaps, and shortfalls
- Recommend DOTMLPF approaches to mitigate those gaps and shortfalls.

In this dynamic environment, it is essential to refine capabilities, current needs, and potential solutions to address current and future threats and sustain the national competitive advantage. Several developments since 2005 provided additional value to the CBA through the FY 2008 update. Firstly, recent studies and analyses by the JRO-CBRND (e.g., the CWA Operational Challenge-Level Study) provided results that impact metrics used to assess CBDP capabilities. Secondly, additional CBDP-related capabilities were identified in other completed and ongoing CBAs, including WMD consequence management. Thirdly, the U.S. Strategic Command (USSTRATCOM) described updated operational environments and capabilities in their CWMD Joint Integrating Concept. Fourthly, an additional conceptual basis for passive defense was provided in the Military Support to Stabilization, Security, Transformation, and Reconstruction Operations Joint Operating Concept. Finally, the interim Guidance for the Development of the Force provided priorities for the *2006 QDR* 20-year planning period. The updated CBA reflects these revisions in requirements, scenarios, and priorities while accomplishing the objectives previously defined in this section.

In December 2008 the JRO-CBRND completed the CBA for WMD Consequence Management that began in August 2006. The WMD Consequence Management CBA includes actions taken to reduce the effects of a WMD attack involving TICs and TIMs and assists in the restoration of essential operations and services at home and abroad. The assessment evaluated the capability proficiency of more than 55 tasks and is combined with a quantity assessment, such as the FPC, to guide consequence management capabilities development.

ACCOMPLISHMENTS

- In FY 2009, the JRO-CBRND finalized the ICD for CBRN consequence management that began in January 2008. The CBRN Consequence Management ICD includes actions taken to reduce the effects of a CBRN event involving standard warfare agents, TICs, TIMs, and NTAs and assists in the response in order to save lives and restore essential operations and services at home and abroad. The document developed 21 materiel and non-materiel solution sets for the tasks, gaps, and recommendations assessed within the WMD Consequence Management CBA to guide consequence management capabilities development.
- In FY 2009, the JRO-CBRND finalized ICDs for CBRN MCMs to establish a baseline to support the incremental development of prophylaxes/therapeutics/diagnostics for CBRN threats. This included the development of an ICD for field analytics, a core capability introduced last year. A Joint Health Risk Management ICD is being developed by the Military Health System to support and complement the field analytics ICD.

INITIATIVES

- The JRO-CBRND is finalizing the CWMD Passive Defense CBA to codify the passive defense specific capability needs, status, and potential solutions to sustain the national competitive advantage.
- The Air Force and the USSTRATCOM Center for Combating WMD (SCC-WMD) are finalizing the ICD for National Technical Nuclear Forensics (NTNF) in accordance with the JCIDS process to guide future NTNF capabilities development.
- The U.S. Army Materiel Command's Research, Development, and Engineering Command, in coordination with JRO-CBRND/JPM-Decon, will be revising the Human Remains Decontamination System (HRDS) Family of Systems (FoS) Capability Development Documents based on the outcome of the AoA. The AoA is in progress.

Assessment

An evaluation of FY 2009 JRO-CBRND JCIDS documents shows that 49 of the 51 (96 percent) documents in place have no issues or an issue that can be resolved within the established process. Ratings were assigned to each JCIDS document based on the following:

- Green: No cross-cutting issues
- Yellow: Cross-cutting issues with identified resolution within established processes
- Red: Critical issues that require GO/FO resolution.

Of the programs of record (POR), only one, the Joint Biological Stand-off Detection System (JBSDS), has a JCIDS document with a critical issue that requires GO/FO resolution efforts. The currently planned system cannot meet one key performance parameter (KPP).

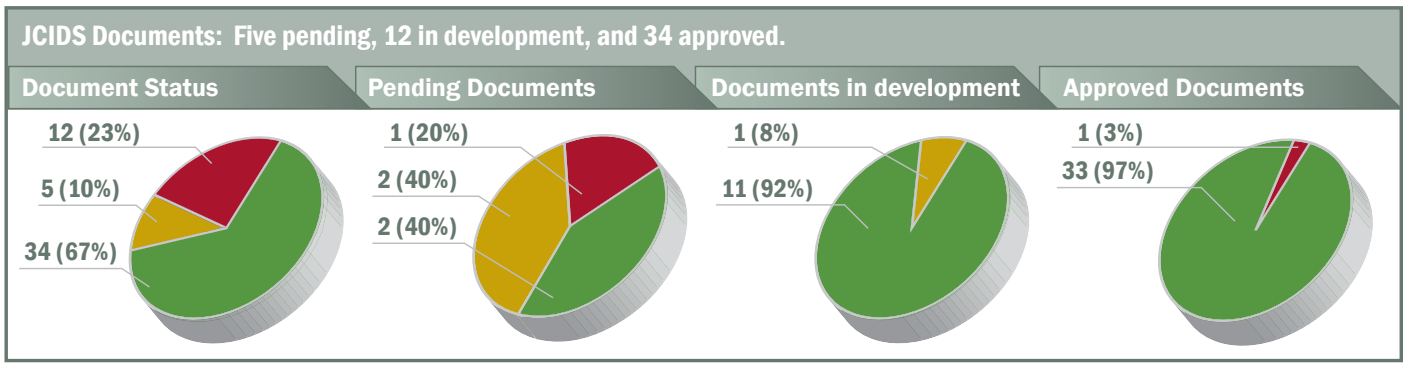
The overall health of the JRO-CBRND JCIDS documents are assessed within three operational categories: approved JCIDS documents, pending JCIDS documents, and JCIDS documents in development. As of FY 2009, 34 of the 51 PORs' JCIDS documents in place were approved, five were pending approval, and 12 were in development.

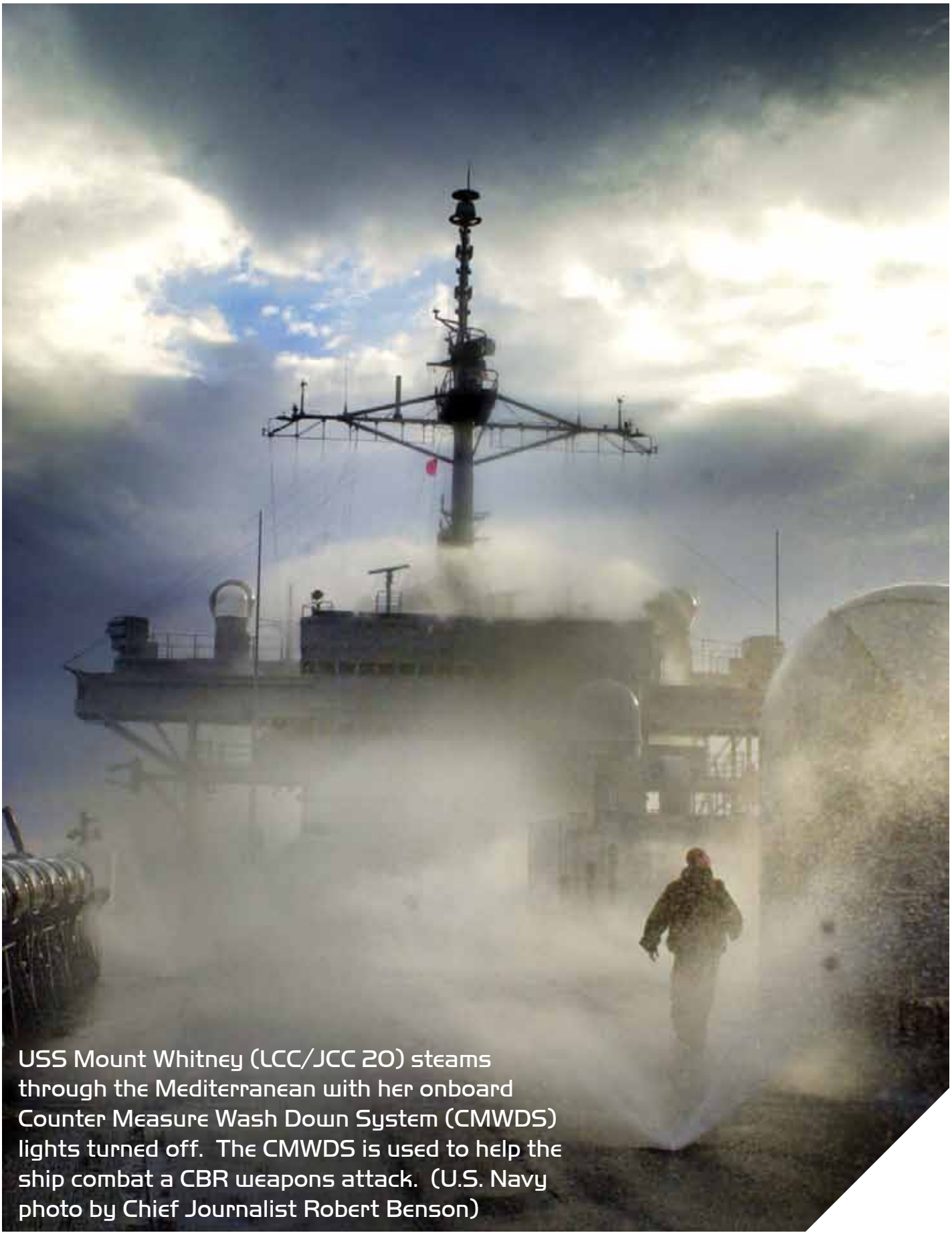
Of the 34 approved documents, 33 had no issues. The JBSDS issues are discussed above. Of the five pending documents, two (40 percent) had cross-cutting issues having a resolution within the established processes, and one (20 percent) had critical issues requiring GO/FO resolution. Of the 12 POR documents in development, one (eight percent) had cross-cutting issues requiring a resolution within the established processes.

Summary

The CBDP, through coordination and integration with the Services and Combatant Commands, develops dynamic Joint capabilities that reduce risk to the Warfighter and prepare the Joint Forces to meet current and future threats. The JRO-CBRND ensures that these processes adhere to DoD 5000 Series, DoDI 3150.09, and CJCSI 3170.01G guidance, and it serves as the CJCS's single source of expertise to address all issues involving CBRN defense. These capabilities are also continually examined and refined to ensure that the most current CBRN defense capabilities, gaps, and shortfalls are being addressed. Teamwork is critical to generate, coordinate, and integrate these capabilities and maintain the national competitive advantage in CWMD.

JCIDS Documents





USS Mount Whitney (LCC/JCC 20) steams through the Mediterranean with her onboard Counter Measure Wash Down System (CMWDS) lights turned off. The CMWDS is used to help the ship combat a CBR weapons attack. (U.S. Navy photo by Chief Journalist Robert Benson)

Science and Technology

The JSTO-CBD, as the focal point for S&T expertise, manages and integrates the discovery, development, demonstration, and transition of timely and effective CBR defense solutions for the DoD.

The CBDP S&T Program addresses current, emerging, and future threats and develops technology solutions to protect the Warfighter, ensuring that the United States is able to maintain a competitive advantage in CBR defense. The JSTO-CBD is responsible for the management of CBR defense S&T, with recognized expertise in the development of future technology solutions to safeguard the DoD Warfighter from WMD by providing capabilities to reduce, counter, and mitigate the effects of these threats.

The JSTO-CBD, as the focal point for S&T expertise, manages and integrates the discovery, development, demonstration, and transition of timely and effective CBR defense solutions for the DoD. The JSTO-CBD performs technical, managerial, programmatic, and staff functions required to plan and integrate a comprehensive and innovative S&T program. The JSTO-CBD's projects and efforts address requirements spanning from near- to long-term. Project Managers balance technology and requirements to advance the gains of basic research, support existing acquisition programs, bridge the capability gaps identified by the Military Departments/Services and Combatant Commands, and explore the passive defense and consequence management ramifications of new and emerging threats.

A research scientist uses microscopy to inspect an experimental sample.

Basic Research and Supporting Sciences

Basic research and supporting science aids all CBR defense technology development by exploring fundamental physical and biological phenomena to address both short-term science knowledge gaps and far-term CBDP capability objectives in both medical and physical sciences to defend and protect the Warfighter. The *2008 CBDP Strategic Plan* directs the JSTO-CBD to "maintain a robust S&T base and promote and exploit scientific discoveries... and answer science questions." The JSTO-CBD not only funds basic research efforts across a broad base of disciplines in academia, DoD laboratories, other government research centers, and industry but also maintains a robust technology watch program that seeks to identify, leverage, and transition new technologies that demonstrate innovative solutions for CBR defense applications. Essentially, basic research provides a robust fundamental knowledge base for countering current and future CB threats through scientific discoveries leading to technological breakthroughs. There are two areas of emphasis under basic research: medical basic research (MBR) and physical basic research (PBR). MBR focuses on the life sciences, including mechanisms of action and injury and biological processes to inform the development of MCMs. PBR focuses on non-living sciences, such as physics, mathematics, and chemistry, to inform development of physical countermeasures. Both medical and physical basic research conduct fundamental research with broad, long-term potential applications to CBR defense. The programs in this area encourage training young investigators and students to become the future intellectual CBDP workforce.

The basic research investment strategy includes needs-based research, basic research which supports the underlying fundamental science relevant to CBR defense, and opportunities-based research to develop revolutionary S&T to enhance future Warfighter protection and survivability through impacts across multiple capability areas. Efforts include nano-scale sciences, information sciences, surface and signature sciences, and chemical and biosciences that expand knowledge in threat agent chemistry and biology for developing physical and medical countermeasures. Basic research is intrinsically high risk because it is not product focused. Instead, it is focused on knowledge discoveries from which the next generation of technologies is developed to protect the Warfighter.

INITIATIVES

- Initiated work to identify and characterize the host cellular factors involved in Venezuelan Equine Encephalitis (VEE) and Eastern Equine Encephalitis (EEE) replication.
- Working to define novel and/or shared antigens from viral and bacterial threat agents to be used in the design of future treatment options.
- Pursuing improved surface and interfacial analytical methods for CB detection.
- Developed the CBDP Service Academies initiative to enhance the current curricula of independent study and to develop innovative S&T to enhance Warfighter protection and mission capabilities. Service Academy participants included the U.S. Army, Navy, and Air Force Academies.

ACCOMPLISHMENTS

- MBR determined that the ability of *Yersinia pestis* (the bacteria which causes plague) to replicate both internal and external to the cell may affect aerosol virulence. This effect seems to be due to the Phage shock protein response regulon. This information will inform development of new MCMs against plague.
- Determined the half-life of Botulinum Neurotoxin in circulation, directly informing the therapeutic window of opportunity for countermeasure development.
- MBR advanced understanding of cellular injury by nerve agents Soman (GD) and sulfur mustard (HD).
- MBR designed and synthesized a novel class of acetylcholinesterase (AChE) reactivators (bifunctional imidazolaldoximes) to aid development of new nerve agent antidotes.
- PBR developed ground-breaking reagent-free laboratory methodology for a rapid microbial identification using a multidisciplinary (proteomics, biochemistry, bioinformatics, and mass spectroscopy) approach.
- PBR developed antimicrobial conjugated polyelectrolyte polymers, which could be used to destroy biological agents in coatings, paints, fibers, and filters, and could be used for water and surface decontamination.
- PBR developed theoretical underpinnings to create unique ultra-oleophobic textile surfaces that "shed" liquids without substantial mechanical action.
- PBR discovered fundamental relationships between soil-moisture and cloud variability and the response of the boundary layer wind and turbulence characteristics through models and observations to inform hazard modeling.

Threat Agent Science

Threat Agent Science (TAS) provides and expands the information available on current and emerging CB agents. This includes characterizing physical, chemical, and/or biological properties of agents; analyzing the interaction of agents with the environment; investigating physiological responses (esp., toxicology) to agents; and developing new research methodologies (e.g., new approaches to CB simulants) to facilitate RDT&E. This information provides the scientific foundation needed to support applied efforts in other CB defense areas (e.g., detection, protection, hazard mitigation, and MCMs). This research also informs Warfighter decision support tools and facilitates development of CB countermeasures across the DoD and OGAs. Resulting knowledge gained from this research also supports changes in TTPs and influences WMD policy and doctrine.

TAS has acquired unique and flexible research tools and associated investigator expertise that continues to inform the CBDP on basic properties of current and emerging threat agents to allow a reasoned and orderly response to their potential use. Recent projects have determined the secondary evaporation rates of several CWAs from environmental substrates as a function of temperature, drop size, relative humidity, and wind speed using unique wind tunnel facilities. These projects further determined the degradation rates of CWAs on ambient and moist substrates as a function of time, identified the products, and determined the activation energies for the reactions. It was found that the nerve agents, GD and HD, will persist for several months at room temperature on ambient sand and would degrade faster in the presence of water on the sand. By contrast, the nerve agent VX on sand degraded more quickly in the absence of water. Non-volatile toxic intermediates were observed for both VX and HD degradation mechanisms, which highlights the need for comprehensive agent fate characterization to determine all potential residual hazards from agent use.

TAS is changing the way that agents are studied by broadening the investigative scope of each effort to maximize the value of each research effort. TAS-sponsored investigations aim to dissect and define the fundamental mechanisms underlying physiological and environmental interactions. Results from such investigations provide a more generalized understanding of agent interactions and are more broadly applicable to real-world conditions than previously collected phenomenological data. This approach significantly enhances the ability to develop CB countermeasures and aids CB-related decision making among field commanders and medical personnel. In addition, understanding fundamental interactions enhances predictive modeling from integrated computational chemistry and biology, thus accelerating the ability to respond to the emergence and/or use of new agents.

Growing concerns regarding NTAs underscore the need to fill critical gaps in physical, chemical, and environmental properties as well as toxicological information pertaining to this class of agents. TAS reshaped a significant portion of its program to focus on NTAs in order to close critical NTA knowledge gaps. This research enables accelerated development and testing of countermeasures against NTAs and identifies toxicological hazards posed to the Warfighter.

INITIATIVES

- TAS began a series of targeted scientific workshops (starting with computational chemistry, chemical agent fate, dermal toxicity) intended to expand the dialogue with potential collaborators (other governmental laboratories, academia, and industry) from the research community outside the traditional CB performer pool. The intent is to draw upon the intellectual resources of the broader scientific community to open the CBDP to new approaches to resolving challenging technical issues.
- TAS developed a series of research efforts aimed at defining S&T needs related to emerging CB agents. The intent of these efforts is to identify how such agents might alter current S&T, TTP, and CONOPS approaches by increasing dialogue between scientists and Warfighters and ensuring that the appropriate people receive necessary information.

During a CBRN refresher class, Airmen watch as M8 chemical agent detection paper changes color on September 9, 2009. M8 paper detects nerve and blister agents. Airmen are shown what to look for so that any found chemical contamination can be reported through the chain of command. (U.S. Air Force photo/Airman 1st Class Staci Miller)

ACCOMPLISHMENTS

- TAS delivered newly revised interim NTA human exposure limits.
- TAS significantly increased the sensitivity of laboratory detection methods for NTA analysis and biomarker quantification. This included developing a new quantitative technique for measuring NTAs in solution using an advanced analytical technology, mass spectrometry with direct analysis in real time.
- TAS defined NTA persistence and transport in sand, concrete, and other surfaces, improving the ability to predict NTA behavior on operationally-relevant materials.
- TAS revealed fundamental metal binding interactions of critical CWA functionalities. This work suggests mechanisms which explain current difficulties in decontaminating metal surfaces and may imply alternative toxicological mechanism(s) of action.
- TAS transitioned a series of new simulants to the Product Director Test Equipment, Strategy, and Support (PD-TESS):
    - Biological detection simulants (fluorescent microsphere technology)
    - An advanced pox virus simulant
    - Permeation simulants for ColPro programs.
- TAS developed advanced agent evaporation algorithms, based on empirical data, which were transitioned to the Joint Effects Model (JEM). The empirical research supporting algorithm development included measuring GD and thickened GD degradation rates on ambient moist sand and evaporation from concrete, sand, soil and stainless steel.
- TAS generated data and information that updated current operational manuals for the Warfighter, including Air Force Manual 10-2602, *TTPs for Vapor Liquid Solid Tracking*, and the Chemical Hazard Estimation Method and Risk Assessment Tool (CHEMRAT).
- Developed detailed, quantitative models for the infectious process of Anthrax, establishing the first low-level exposure risk models for rabbits and humans.

Medical Science and Technology

The Medical S&T mission is to provide MCMs that protect and sustain individual health and force strength in the event of a CBRN exposure or attack. As outlined in the table below, medical S&T is focused on the generation of vaccines and/or pretreatments to prevent Warfighter casualties, rapid diagnostic capabilities for the timely diagnosis of specific exposures, and novel therapeutics to provide treatment and return to duty. Medical S&T research occurs in the areas shown in the table below.

Medical S&T Research Areas
Pretreatments
Develops vaccines and chemical prophylaxes that protect the Warfighter prior to exposure to BW and CW agents. The goal is to prevent the adverse effects of exposure.
Diagnostics
Develops improved screening procedures and analytic methods to verify exposure/infection and determine the effects of exposure/infection to BW and CW agents to assist in the determination of treatment course by health care workers.
Therapeutics
Develops therapeutic modalities to treat the Warfighter following an exposure to a CW agent and/or infection with a BW agent. The goal is to sustain the force and reduce the adverse effects of exposure.
Medical Radiological Defense
Develops MCMs (pretreatments, therapeutics, biomarkers/dosimetry) against radiological and nuclear threats. The goal is to develop prophylaxes (radioprotectants before radiation exposure) and therapeutics to mitigate complex post-radiation injuries. Develops biodosimetry methods to ascertain individual radiation exposure in order to determine an appropriate treatment course.

ACCOMPLISHMENTS

- Developed a deoxyribonucleic acid (DNA) vaccine against Alphaviruses (Western Equine Encephalitis, VEE, and EEE) delivered by electroporation, which showed efficacy in non-human primates (NHP).
- Demonstrated that VEE Replicon-based vaccines against Alphaviruses elicit a durative response in mice (tested out to six months) and protect mice and NHPs from aerosol challenges.
- Manufactured a production lot of RVec, a protein subunit vaccine for Ricin toxin, using good manufacturing practice for use in an upcoming Phase I clinical trial.
- Demonstrated that vaccines against Ebola and Marburg virus strains expressed in a Vesicular stomatitis virus platform are safe in immunocompromised NHPs and protect NHPs from lethal virus aerosol challenges. In addition, a blended multi-component vaccine can protect NHPs against multiple strains with a single dose. These results were published in three peer-reviewed scientific journals.
- Transitioned the Modular Immune *in vitro* Constructs (MIMIC) technology from the Defense Advanced Research Projects Agency's (DARPA) Rapid Vaccine Assessment (RVA) Program and began using the technology to evaluate human immune responses to DoD vaccine candidates (i.e., vaccine candidates against Filoviruses and Alphaviruses).
- Leveraged Department of Homeland Security (DHS) investment in the development of an optical mapping bacterial genomic identification platform technology.
- The Office of the Assistant Secretary of Defense for Health Affairs (OASD(HA)) launched a CB Warfare Exposures website, http://fhp.osd.mil/CBexposures, which was designed to provide Service members, veterans, their families, and the public with information on historical CB testing that potentially affected the health of those who served.
- Established new methods for *in vivo* expression of bioscavenger candidates.
- Developed high-throughput assays to assess candidate catalytic bioscavengers.
- Investigated multiple therapeutic approaches for organophosphonate (OP) exposure including: catalytic bioscavenger, improved cholinesterase reactivator, neuroprotectant, atropine replacement, and anti-seizurants.
- Further studies completed on the central nervous system mechanism(s) of action, potential therapeutic approaches, animal models, and various modeling approaches for NTAs.
- Established doses of linolenic acid and GluR5 antagonists for protection from acute and delayed brain injury caused by OPs.
- Received results showing promising centrally active candidate oximes against traditional agents and NTAs.
- Evaluated the inhalation of GD and other nerve agents by completing descriptive pathophysiologic dose and time studies.

Ebola virus.

The Medical S&T program's efforts are designed to ensure that countermeasure candidates meet requirements for transition out of the technology development phase and are consistent with technical information required for an Investigational New Drug (IND) application with the FDA. Maturing technologies are integrated into the product development team process to plan for appropriate systems acquisition. Medical S&T manages efforts under the medical-chemical, medical-biological, and medical-radiological defense portfolios.

Medical pretreatments and therapeutic strategies reduce performance decrements, injuries, and deaths of military personnel in the field, enabling Warfighters to better accomplish their missions and reducing the need for medical resources and the probability of long-term health effects.

ACCOMPLISHMENTS

- Developed a chemical diagnostics assay for simultaneous identification and quantification of several nerve agent metabolites in biological fluids utilizing solid phase microextraction coupled to gas chromatography-mass spectrometry.
- Continued investigating the S&T issues related to truncated flagellin (CBLB502), which is in advanced development as a promising therapeutic candidate for the treatment of ionizing radiation exposure.
- Demonstrated that genistein (pretreatment) plus catopril (treatment) enhance protection of blood cells and bone marrow against radiological injury.
- Leveraged DHS S&T investment for biological diagnostics in development of an optical mapping tool. In its current configuration, this tool can be employed in *a priori* (independent of experience) identification of bacterial pathogens. The Medical S&T Division and DHS agreed that two prototype platforms will be made available to JSTO-CBD-supported laboratories beginning in FY 2009. In conjunction with DHS and OGAs, a strategy for application-specific evaluation of platform maturation potential was initiated.
- Augmented OGA investment for diagnostics in development of a DNA sequencing platform that will facilitate DNA sequencing in a field environment. The instrument will be available for field-testing in FY 2010.
- Transitioned Recombinant Human Monoclonal Antibodies for therapeutic treatment of exposure to Staphylococcal enterotoxins A and B to advanced development supported by the National Institute of Allergy and Infectious Diseases (NIAID).
- Developed inhibitors of Botulinum neurotoxin with the highest level of *in vivo* efficacy to date.
- Completed pivotal Variola (smallpox) efficacy study required for licensure of ST-246 for treatment of smallpox.
- Developed high-throughput screening assays and identified novel small molecule compounds with efficacy against filoviruses and alphaviruses *in vitro*.
- Identified two U.S. Food and Drug Administration (FDA)-approved drugs with efficacy against lethal challenge of Ebola in mice.
- Utilized high content imaging to identify novel pathogen and host-directed targets involved in bacterial and viral pathogenesis.
- Identified CD45 as a novel host derived target for anthrax and demonstrated that reduced CD45 expression provides protection against anthrax pathogenesis.
- Identified anthrax protein CapD as a potential therapy for multi-drug resistant anthrax.
- Developed monoclonal antibodies that confer 100 percent protection against the aerosol challenge of Burkholderia in mice.
- Evaluated efficacy of FDA-approved antibiotic moxifloxacin in mice against the aerosol challenge of plague.
- Established collaboration with the National Institutes of Health (NIH) National Chemical Genomics Center to identify small molecule compounds with efficacy against VEE and Botulinum neurotoxin.
- Filed provisional patent for Urinary Field Sampling Kit for the determination of nerve agent exposure.

Developing improved treatments for CB agent exposure for use in a field environment.

Medical Chemical Defense Research

The Medical Chemical Defense Research Program's overarching goal is to protect the Warfighter from harmful effects of both traditional and non-traditional chemical threats. This is accomplished through medical pretreatments, therapeutics, and diagnostic capabilities. The main areas of research focus on nerve agent bioscavengers, neurological protectants, vesicant therapeutics, AChE reactivators, and chemical medical diagnostics. Current research in nerve agent bioscavengers focuses on catalytic proteins, where one enzyme molecule can neutralize many molecules of the nerve agent. Neurological protectant research focuses on preventing brain tissue damage and treating seizures brought about through nerve agent exposure. Development of vesicant therapeutics will treat the eyes, skin, and respiratory system after exposure to vesicant agents. Reactivator research examines candidate compounds for an ability to counteract nerve agents. Chemical medical diagnostic research develops assays and devices to detect exposure levels from a variety of chemical threats.

INNOVATIONS

- Ocular administration of ribonucleic acid interference is being optimized as a potential therapeutic which may target inflammatory cytokines involved in GD-induced ocular injury.
- Used adenovirus vectors to induce *in vivo* expression of bioscavengers, including butyrlcholinesterase and catalytic bioscavenger candidates.
- Utilized proteomics to determine protein biomarkers of HD ocular exposure using a rabbit eye model.

Medical Biological Defense Research

Medical Biological Defense Research focuses on developing MCMs to include pretreatments, therapeutics, and diagnostics effective against biological warfare agents (BWA). Research activities concentrate on preventing (i.e., vaccines) or reducing (i.e., therapeutics) the lethal and incapacitating effects of viral, bacterial, and toxin threat agents. S&T aimed at the generation of vaccines utilizes novel expression platforms, alternative vaccine delivery mechanisms, and technologies that predict immunogenicity in humans in order to ensure maximum vaccine efficacy against aerosolized threats. Whereas the focus of vaccines is to protect the Warfighter prior to exposure with a BWA, therapeutics are required to sustain the Warfighter following an exposure. Biological therapeutic S&T is focused on generating novel anti-microbials and anti-toxins, using small molecule inhibitors that target either pathogen or host pathways. Alternatively, new indications for FDA-licensed products are pursued for use in the treatment of BW casualties. MCM effectiveness critically relies on the ability to rapidly diagnose that a soldier has been exposed to a threat agent and the specific identity of that agent. To this end, biological diagnostic research is focusing on the development of fieldable assays for threat agent identification in clinical samples. In addition, research is being conducted in an attempt to identify biomarkers indicating that an infection has occurred prior to the onset of symptoms, allowing rapid, "presymptomatic" diagnosis and treatment.

Medical Radiological Defense Research

The goal of the Medical Radiological Defense Research Program is to prevent and treat injury to the Warfighter as a result of radiological exposure. Though there are countermeasures available to prevent absorption of radiological agents and to treat internal contamination, there are no countermeasures developed to reverse the effects of ionizing-radiation exposure. This research area is making significant progress in identifying potential candidate compounds as well as in developing highly accurate biodosimetry capabilities, which will allow for battlefield estimates of the radiation dose received under battlefield conditions. Accurate estimation of radiation exposure is critical for determining proper treatment regimens and protective measures.

INITIATIVE

Developing MCMs to sustain and restore Warfighter operations in an environment compromised by CBR agents.

INNOVATIONS

- Transitioned MIMIC technology from DARPA to evaluate the effectiveness of BWA-specific vaccines and therapeutics in human cells. This innovative technology provides an automated, high-throughput, rapid, and predictive process that reduces the number of laboratory animals required for screening and thus provides the opportunity for significant savings in cost and development time.
- Novel platforms are utilized for the generation of multi-agent/-valent vaccines against BWAs that afford protection against multiple closely related agents or unique combinations of disparate biological threat agents. These technologies may reduce the number of individual vaccines required for the Warfighter and thus decreases advanced development costs.
- Directed efforts in biological therapeutics leverage cutting-edge technologies, such as nanotechnology and small molecule applications, to mitigate post-exposure effects of biological threat agents.

Cutting-edge technology for research and development (R&D) of CB agent countermeasures.

Transformational Medical Technologies Initiative

The TMTI commenced in the third quarter of FY 2006 and integrates the S&T capabilities of the JSTO-CBD with the acquisition capabilities of the JPEO-CBD into a single process responsible for the end-to-end development and delivery of capabilities enabling rapid response to genetically engineered and emerging biological threats. The TMTI Program Office (PO) receives program oversight from the ATSD(NCB/CB) and guidance from an executive office, which is made up of senior leadership from both the JPEO-CBD and JSTO-CBD.

The near-term goals for the TMTI portfolio are to file two IND applications against HFVs and ICBs, respectively; develop two or more broadly enabling platform technologies; and sequence all pertinent threat agents. The long-term goal of the TMTI is to establish an integrated capability to respond to emerging and genetically modified biological threats. The TMTI PO has two portfolios to manage projects: a Technology Portfolio to manage projects that will deliver response capabilities and a MCM Portfolio to manage projects that will deliver medical products. The ultimate goal for MCMs is FDA licensure.

After a gap analysis of the Technology and MCM Portfolios, the TMTI solicited the following new technologies:

1. Viral Genetic Sequence Database
2. Animal Models for the FDA Animal Rule
3. Computational systems to enhance rational drug design and *de novo* drug development
4. Therapeutic Countermeasures against U.S. Centers for Disease Control and Prevention (CDC) Category A and B threat agents
5. Systems biology platforms for the determination of therapeutics targets in host-pathogen interactions
6. High-throughput screening platform for *in vitro* screening of drug candidates.

The TMTI received 119 submissions in response to the solicitations. Contracts awards are expected to occur in FY 2010.

ACCOMPLISHMENTS

- The JSTO-CBD transitioned 20 technologies, submitted two INDs in the first quarter of FY 2009 for HFV therapeutics, and signed 22 Technology Transition Agreements (TTA).
- The U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID), Edgewood Chemical Biological Center (ECBC), and Naval Medical Research Center (NMRC) supported building the initial foundation for a genetic sequencing capability within the DoD.

In FY 2009, the TMTI achieved a significant milestone—the FDA accepted two INDs for indications against exposure to Ebola virus (Zaire) and all strains of Marburg virus. The Phase I clinical trials and pivotal animal efficacy studies will be conducted in FY 2010 and FY 2011. Additionally significant is that the IND candidates are generated from a platform technology that enables the rapid generation of new countermeasures against emergent and genetically engineered threats. To test this platform, the TMTI has undertaken an exercise of the performer's capability to identify, test, and manufacture MCMs against the current pandemic flu outbreak (A/H1N1 S-OIV) for pre-clinical animal testing. The experiment will conclude after the demonstration of efficacy of the countermeasure in small animal models. If successful, these efforts will demonstrate the solution to the requirements: one MCM against HFVs and one broadly enabling platform technology.

INITIATIVES

- The TMTI is on schedule to stand up an initial genetic sequencing capability for the DoD by FY 2011. This capability is being established at the USAMRIID, the NMRC, and ECBC with technical assistance from academic centers of excellence. Additionally, the Air Force Research Laboratory (AFRL) is being funded to use its high-speed computing center to provide the required bioinformatics capability, which will accelerate the generation of potential leads using rational drug design and systems biology frameworks. The TMTI has already demonstrated a genetic sequencing prototype capable of identifying genetically modified pathogens, transforming a process that used to take days into taking only hours. The TMTI has created a genetic sequence database of bio-threat agents that provides the capability to rapidly identify modified pathogens. This genetic sequence database will include the most prevalent strains from the list of bioagents. The TMTI has begun to leverage systems biology approaches to identify targets within the host and the pathogen. These approaches will yield new avenues that can be explored to generate broad spectrum MCMs to protect the Warfighter and the nation.
- The TMTI continues to integrate early scientific discovery with advanced development, which is the acquisition model created with this initiative. With the unified efforts of the JSTO-CBD and JPEO-CBD, the TMTI brought forward the first MDD and Milestone (MS) A in accordance with DoDI 5000.02, *Operation of the Defense Acquisition System*. The MS A approved the advanced development of a class of therapeutics for HFVs rather than a single product line. The innovative use of a class of MCMs continues to expand the capabilities of the DoD while maintaining the standards and acquisition rigor necessary when entrusted with the taxpayer's money.

Physical Science and Technology

The JSTO-CBD Physical S&T Program emphasizes innovation in managing multi-disciplinary applied research and advanced technology development to meet physical technology needs and capability gaps. The physical S&T portfolio ensures the effective transition of resulting technologies to Joint acquisition programs and provides insights to policy and doctrine communities by maintaining a robust technology base (i.e., knowledge, research capabilities, and T&E methodologies).

The Physical S&T Program has the following goals:

- Meet the technology needs and capability gaps defined and prioritized by the JPEO-CBD and JRO-CBRND
- Emphasize innovation in multidisciplinary applied research by leveraging advances in basic research
- Ensure effective and continual transition of resulting technologies to Joint acquisition programs
- Provide new insights into policy and doctrine
- Manage and balance risk with potential rewards against schedule while optimizing potential advances in science and technology.

INNOVATION

Efforts in physical countermeasures involve a focus on the convergence of nanotechnology, biotechnology, information technology, and cognitive sciences (NBIC) to make the use of CWAs or BWAs ineffectual. The vision of the future is an integrated protective ensemble based on the convergence of NBIC technologies. This ensemble will sense the presence of adverse substances, initiate countermeasures regardless of the origin or type of threat, and provide real-time battlefield awareness to the wearer and to the command nodes with minimal burden on the individual Warfighter and the logistical infrastructure. The development of a technology roadmap will plot the technical direction and help identify the technical priorities.

Detection

Detection research develops CB sensor components for stand-off applications, CB point identification, lightweight integrated detection and identification, and detection of CB contaminants in water to enable contamination avoidance. This research also emphasizes early warning applications, which include capabilities for CBRN reconnaissance and situational awareness of the total battle space CBRN threat. Reconnaissance, detection, and identification are necessary for forces to assume the appropriate protective posture at fixed sites where the Warfighter cannot avoid contamination or for missions requiring operations in a contaminated environment.

This research area also develops sensors for the individual Warfighter and systems capable of detecting multiple agents and characterizing new agents to provide situational awareness for battle space management decisions. The heightened operational tempo of future warning capabilities will reduce force degradation caused by CB-contaminated environments.

INITIATIVES

- Detection:
  - Partnered with the National Science Foundation to initiate development of Next Generation Algorithms for large heterogeneous data sets.
  - Initiate new effort to develop Next Generation Chemical Standoff technology to meet change in the threat environment, specifically detection of contamination on surfaces.
  - Initiate new effort on Ultra Rapid Next Generation Pathogen Identification, a fully integrated and automatic system from sample to pathogen nucleic acid sequence data.
- Begin transition of DARPA Micro-Cryogenic Cooler technology to enhance detection sensitivity for microelectromechanical systems Fourier transform infrared sensor systems, specifically detection of contamination on surfaces.
- The DARPA's RealNose Program has an ultimate goal of developing a breakthrough odorant detection system with potential capabilities beyond that of the canine olfactory sense. Currently, researchers are working to create a breadboard device capable of sensing and identifying 10 odorants at the canine limit of detection.
- The DARPA's Hyperadsorptive Atmospheric Sampling Technology Program will enable routine and economical chemical mapping of battlefield and urban environments to identify chemical threats, sources, and opportunities based on correlations among natural and anthropogenic chemical emissions. Exhaustive sampling enables discreet, high fidelity determination of chemical, biological, radiological, nuclear, and (high-yield) explosive (CBRNE) signatures to support strategic and tactical intelligence as well as force protection. The Program is conducting system integration to demonstrate materials, packaging, and extraction technologies that sample atmospheric impurities whose concentration ranges from 10 parts per trillion (ppt) to 100 parts per million (ppm) by volume from 100 liter-atmospheres of gas in less than five minutes.
- The DARPA's Mission Adaptable Chemical Sensors (MACS) Program goal is to provide the military with a compact, portable chemical sensor that analyzes an atmospheric sample and quickly identifies constituent gases. In a test administered by the U.S. Army's Aviation and Missile Research, Development, and Engineering Center in Huntsville, AL, the MACS prototype correctly identified greater than 30 unknown chemical constituents with no false alarms and a sensitivity of less than one part per billion (ppb).

ACCOMPLISHMENTS

- Low Cost/Low Power UV Detection (TacBio) – Prototype detector that exploits the use of low cost mass produced Semiconductor Ultra Violet Optical Sources (SUVOS) semiconductor technologies and next generation of molded plastic optical components as a means of achieving a lightweight, low cost, low power biological agent aerosol detection system.
- Range Test Validation System – Provides the chemical vapor T&E environments with the ability to visualize the chemical contamination in 3-D space via infrared imaging technology as ground truth under operational use conditions for standoff and ground sensor system under test.
- Next Generation NTA Test Facility – Design data for the NTA facility is complete. Safety data to establish the operational protocols is on schedule to meet facility on-line date at beginning of FY12.
- High Performance Trigger Technology (Rapid Agent Aerosol Detector, RAAD) - Next generation trigger system to detect the presence of biological aerosol threats at a false alarm rate of one per week (excess of 10X improvement) and an increase of 5X reliability without the loss of sensitivity is possible through the integration of multi-frequency UV laser induced fluorescence combined with structured trigger beam and spark induced breakdown spectroscopy technologies.
- Heated Inlet for Lightweight Chemical Detector (LCD) – A specifically designed heated inlet prototype is now available to enhance the LCD performance for low volatility materials without impacting performance to standard vapor threats.

Protection and Hazard Mitigation

Protection and hazard mitigation research seeks to provide the capability to shield forces from CBR hazards by preventing or reducing individual and collective exposures, thereby preventing or minimizing negative physiological effects, protecting critical equipment, and reducing hazards after employment of CBRN weapons to restore the capability of contaminated units. The protection and hazard mitigation capability area is divided into thrust areas that address the following specific aspects: individual protection, ColPro, air purification, hazard mitigation, and test methodologies.

ACCOMPLISHMENTS

- Completed and transitioned enhanced chemical test methods for decontamination. These methods include hazardous byproduct and residual agent test standards using high performance liquid chromatography, a small item decontamination test method and fixture, and an improved decontaminant performance evaluation methodology.
- Completed data gap analysis and final data gap testing of a catalytic oxidation (CATOX) air purification technology to support the demonstration of this system for armored vehicle and shipboard application.
- Developed a shelter barrier material that provides liquid agent protection without use of a liner, which is being considered for the Chemical Biological Protective Shelter (CBPS) program and the Joint Expeditionary Collective Protection (JECP) system.
- Completed development and transitioned sensitive surface and vehicle interior "Decon Wipe" technology for application to the Joint Materiel Decontamination System (JMDS).
- Completed development and transitioned electrochemically activated (aqueous) chlorine dioxide technology for chemical and biological decontamination and transitioned for application to the Joint Services Family of Decontamination Systems (JSFDS).

The Small Item Decon Testing Chamber (shown below) is part of a portfolio of test chamber designs, prototypes, and procedures transitioned to the PD-TESS in support of sensitive equipment decontamination studies for the JMDS acquisition program.

INNOVATION

- Developed and tested a new adsorbent formulation based on a zirconium hydroxide/zirconium oxide mixture for application to air filtration. This formulation demonstrated significant performance capabilities, especially against highly volatile TICs, over a wide range of environmental conditions when compared to current activated carbon technology.
- Developed and demonstrated surface coating technology that increases degradation rates of chemical agent residuals from weeks to days.
- Developed a new surface chemistry analysis tool apparatus at Virginia Polytechnic Institute and State University that enables fundamental investigations for performance improvements of decontamination and adsorption technologies and installed it at ECBC. This tool will allow researchers to focus on interfacial processes in decontamination that has proven to be the limiting factor for many promising technologies.
- Developed a decontamination disclosure spray system that demonstrated high sensitivity for selected agents including NTAs.

INITIATIVES

- Work continues to focus on the development to improve performance of broad-spectrum general purpose decontamination formulations that are applicable to chemical ad biological agents over a wide-range of environmental conditions to support JSFDS. This year, work was initiated on development of formulations that can be adjusted by the operator at the point of use to optimize the mixture for agent type, contaminated surface material, and environmental conditions. Additionally, focused work was initiated to develop decontamination enzymes with enhanced shelf and pot-life stability. Enzymes, if made logistically practical, have the potential to significantly increase decontamination performance, while remaining gentle to sensitive materials.
- Work was initiated to test and determine the potential value of various system-of-systems approaches to decontamination. These include analyzing and testing combinations of self-detoxifying surfaces, strippable and encapsulating coatings, agent disclosure treatments, and energy-based approaches. The goal is to develop and transition technologies, that when applied in combinations can rapidly reduce the risk of chemical and biological warfare agents to the Warfighter and facilitate lowering of the Mission-Oriented Protective Posture (MOPP) level. Long-term efforts are geared to provide “smart decontamination” systems that sense the presence of agent, respond to the agent by releasing active decontaminant only where it is needed, and signaling the initiation and completion of the process.
- Activated carbon has been used as a filtering material for ocular, respiratory, and percutaneous protection for over 90 years. Work continues to exploit recent technological gains in nanotechnology to find better materials. The objective is to increase capacities and adsorption rates, especially against highly volatile TICs, to facilitate lower profile and lower resistance filters. These technologies will be exploited to enable novel respirator design to reduce that reduces the burden to the Warfighter. Additionally, these technologies will be exploited to reduce the costs and increase the performance of collective protection systems.

Information Systems Capability Development

This research area, in support of battle space information and related systems, provides information collection, fusion, and rapid-knowledge generation for all CBRN defense assets throughout the battle space. DoD advanced development programs and information systems technology research emphasize expert scientific knowledge and insights, exploiting cutting-edge information system technologies, and a variety of innovative software tools and products. By delivering capabilities that enable CBRN situational awareness and hazard warning, as well as prediction within the battle space, these efforts support the integration of threat information, CBRN sensor and reconnaissance data, protective-posture data, environmental conditions, fusion of medical surveillance data, and informatics-related capabilities.

These advanced tools rapidly provide the Warfighter and decision makers with the ability to quickly analyze courses of action before or during operations. Aspects of decision support for CBRN defense include Joint Force protection, restoration of operational tempo, casualty care treatment, MCM development, and intelligent resource allocation. Warning and reporting capabilities provide the hardware and software to connect detection systems into the overall command and control (C2) architecture. These S&T efforts also aid in the assessment of Joint and multi-Service doctrine, materiel development, and virtual equipment and countermeasure design. Information systems capability development supports Warfighter and battle staff training by employing larger conflict simulations and performing support analyses of CBRN defense operations within the context of larger military operations in support of consequence management. These efforts also support simulation-based acquisition in the development of critical CBRN defense capabilities.

Joint Materiel Decontamination System

ACCOMPLISHMENTS

- Transitioned sensor data fusion, sensor placement tool, and outdoor source term estimation technologies to the JEM and JPM-Guardian Programs.
- Developed advanced source term modeling capabilities. Transitioned expanded geographic database system, extended mass consistency wind model, variable resolution climatological and atmospheric database, and improved TIC/TIM prototype to the JEM Program.
- Delivered the following to the JPM-IS:
  - Legacy Consequence Management System Software
  - Tactical Aircraft Modeling System
  - Radiological operational effects and chemical improvised explosive device threats on mobile forces reports.
- Transitioned initial Nuclear, Biological, and Chemical (NBC) Casualty Response Estimation Support Tool human effects models to the JPM-IS.
- Transitioned tactical aircraft capability for the Air Force's Simulation, Training, and Analysis for Fixed Sites, Output Analysis Tool, and initial CHEMRAT to the JPM-IS.
- In collaboration with the U.S. Transportation Command (USTRANSCOM), integrated CB effects on the tactical level Aerial Port of Debarkation model into USTRANSCOM's global theater level model.
- Released beta version of the Contact Hazard, Residual Hazard, Efficacy, Agent, T&E, Integrated, Variable Environment Decontamination Model to the JPM-Decon and Deputy Under Secretary of the Army Test and Evaluation Office (DUSA-TEO).
- Developed a MediaWiki format semantically linked subject matter expert (SME) wiki-database of members of the CB professional community; submitted for hosting on the DTRA intranet portal.
- Developed prototype of the CBRN Data Backbone.

INITIATIVES

- Collaborated with the North Atlantic Treaty Organization (NATO) on Allied Medical Publication 8 (AMedP-8(C)). The methodologies in AMedP-8(C) are used as a basis for calculating casualty estimation in acquisition programs.
- Created a Configuration Management Prototype to provide modeling, simulation, software development, software integration, and integration analysis support to the JSTO-CBD concerning establishment of a S&T framework and supplemental configuration management to the JPM-IS consequence management plan, as well as development, validation, and verification of CBRN models and the integration of these models into the relevant acquisition program software.

INNOVATION

Exploring the concept of an innovative centralized, intelligent, and autonomous information processing center. This capability could support and enhance cognitive functions such as learning, memory, perception, prediction, and decision making; and seamless integration with the protective system providing understanding to mimic the molecular function, structure, process, and architectures with these synthetic materials.

The Information Systems Technology research area exploits cutting-edge information system technologies and a variety of innovative software tools and products to provide the Warfighter and decision makers with the ability to quickly analyze courses of action before or during operations.

Test, Demonstration, and Integration

Advanced technology development explores new operational concepts and the military utility of emerging S&T achievements as applied and demonstrated in operationally relevant environments. These efforts use the tools and methodologies of ATDs, ACTDs, and/or JCTDs to create an integrated technical capability suitable for operational demonstration and military utility assessments and feedback. The goal of these projects is to work closely with operational transition and technical managers and to accelerate capabilities out of S&T and into the acquisition process while demonstrating useful military capabilities at technology readiness level (TRL) six or higher. The outcome is a robust understanding of capabilities and limitations with risks mitigated for transition to acquisition programs. The capability prototypes assessed in a relevant environment represent a major step up in CBR defense technology's demonstrated readiness for operational applications.

ACCOMPLISHMENTS

- CBRN Unmanned Ground Reconnaissance ACTD:
  - Developed an advanced sensor capability for near-real-time (NRT) chemical detection and identification for manned platforms at maneuver speed and demonstrated the military utility of unmanned platforms for CBRN reconnaissance.
  - Transitioned CBRN Unmanned Ground Vehicle (CUGV) and Joint Contaminated Surface Detector (JCSD) technology to the JPM-NBC CA.
  - Transitioned CUGV technology to the Product Manager Consequence Management, Navy Explosive Ordnance Disposal Technology Division, Future Combat System Small Unmanned Ground Vehicle, and to industry (iRobot Corp).
  - Identified new agent/simulant correlation and test methodology and procedures for optical detection of chemical contamination employing Raman Technology using the JCSD.
- Interagency Biological Restoration Demonstration (IBRD): The IBRD Program developed a path forward for testing the sporicidal efficacy of six disinfectants, down-selected through a peer review panel, via the newly developed Three Step Method (ASTM-2414-05). The goal was to provide first responders a suite of *Bacillus anthracis* decontaminants that would be granted a crisis exemption for wide-area, outdoor use on DoD installations and critical infrastructure in the event of an Anthrax release.
- The OSD selected the Joint Medical Distance Support and Evacuation (JMDSE) JCTD as their number four priority in FY 2009 to address the global quick reaction medical response challenge to a biological WMD event. Of particular interest to the JSTO-CBD was the evaluation of the military utility of coupling biological detection and sampling systems with rapid/remote medical response; developing concepts of employment and operation for the use of tactical biological detection systems; and assessing the DoD's capability to respond to biological attack affecting forward operating bases, detached units, and local affected populations. JMDSE assessed and formalized the CONOPS for this JCTD and their demonstration/deployment in a relevant environment.

Development of CBRN unmanned ground reconnaissance vehicle to provide increased CBRN detection capabilities while reducing risk to the Warfighter.

ACCOMPLISHMENTS

- Military Applications in Reconnaissance and Surveillance Joint Force Protection ATD: Within the operational theatre, commanders need the information provided by a CBRN detection network to detect, identify, map, quantify, and track threats as early in an attack as possible to increase options for operational responses, including which protective posture to assume. The CONOPS for this ATD were defined and risk mitigation plans were developed.
- The Hazard Mitigation, Material and Equipment Restoration (HaMMER) ATD supports the Warfighter by developing an integrated system of decontaminants, applications, and processes for CBR contaminants for all surfaces in all environmental conditions, ultimately reducing hazards so that equipment is operationally useful. Technologies were selected, and test protocols and performance metrics have been established.
- The Auto Decon ATD will evaluate the current detailed equipment decontamination process for land vehicles and prototype an improved process. Accomplishments included the development of the Process Evaluation Tool.
- The Individual Protection (IP) Demonstration ATD will demonstrate the integration of CB IP technologies into a system and determine the best achievable CBR protection performance without increasing the wearer's thermal burden. FY 2009 accomplishments include:
    - System design and optimization of garment technologies with thermal performance equal to or better than the Flame Resistant Army Combat Uniform
    - Design and development of a fully integrated mask/respirator helmet set with heads up displays
    - Improvement of the Warfighter's CBRN situational awareness through the development of cutting-edge sensor technologies that are integrated to communications architectures
    - Assessment of individual technology TRLs to support transition to the JPM-IP, JPM-IS, and Project Manager Soldier Warrior.

A future technology application under experimentation for supporting maneuver forces in a CBRN environment.

Assessment

The JSTO-CBD conducts annual technical reviews of projects and programs in order to assess scientific merit and programmatic applicability. Funded performers present projects in terms of goals, activities, and results to independent review panels comprised of members from government, industry, and academia who are SMEs. These panels assess the projects for relevance and quality of effort. In addition, JSTO-CBD executes an internal Program Management Review process that provides visibility and allows accountability through all levels of management for performance, cost, and schedule. Each Capability Area is reviewed at least once a year. During the annual program build, the JPEO-CBD, JRO-CBRND, and the T&E Executive are invited to critique and provide feedback during the review and selection of projects to be funded to ensure that priorities and needs are being met across the CBDP.

The OATSD(NCB/CB) hosted a CB Defense S&T Review in September 2009. The JSTO-CBD presented the CB Defense S&T Program to an independent review panel made up of SMEs and representatives from the CBDP components. The purposes of the review were to:

1. Review the CB Defense S&T Program against the S&T strategy
2. Identify the benefits and key accomplishments of the CB Defense S&T Program
3. Provide insight and appreciation of the objectives, aims, and research plans of the CB Defense S&T Program
4. Highlight the strengths and raise critical CB Defense S&T Program issues or gaps
5. Ensure that the CB Defense S&T Program is aligned with the CBDP to address high-priority needs.

Most of the areas reviewed were rated as generally progressing satisfactorily.

The Basic and Supporting Science Research Program conducts internal technical reviews in a variety of venues. Internal management reviews are conducted periodically through site visits and communication between Principle Investigators (PI) and Science and Technology Managers (STM), as well as quarterly and/or annual reports submitted by the PIs. Scientific peer panel reviews are conducted annually to assess technical quality of research, where PIs present project goals, activities, and results to independent peer review panels comprised of SMEs from government, industry, and academia. These panels assess projects for relevance and quality of effort. Projects with less than six months of performance are not evaluated for progress. Through these reviews, 41 PBR projects, 35 MBR projects, and 33 TAS projects received technical assessments. Furthermore, the reviews provide an opportunity to inform the applied research STMs, the T&E community, and other stakeholders of occurring discoveries that could impact technology development in their areas.

The Medical S&T program reviews determined that all projects within the portfolio are relevant to Warfighter needs. A review was conducted by the JRO-CBRND, Service representatives, and the advanced developer (JPEO-CBD) as well as a separate review by the JRO-CBRND, Service representatives, and representatives from the Combatant Commanders. These separate reviews were intended to ascertain project applicability and relevance, and resulted in several projects being re-focused or re-scoped in order to more effectively address technology gaps. The CBDP major partners (JRO-CBRND, JPEO-CBD, JPM-CBMS, and OASD(HA)) participated in the FY 2010/FY 2011 Medical S&T programmatic build and approved all of JSTO-CBD FY 2010/2011 funding. JSTO-CBD has hosted multiple Transition Quarterly Reviews (TQR) for each capability area at which all of the above CBDP partners have been in attendance. The TQRs have resulted in the representation of all of the projects, within a given Medical S&T capability area, in either a TTA or a Capability Transition Agreement (CTA), demonstrating acceptance of the Medical S&T program from all of the CBDP stakeholders.

The Information Systems Capability Development program directly leveraged the annual Science Review to contribute to the current assessment process. Nearly concurrent with this review of ongoing S&T projects was the review of Phase I and Phase II new-start proposals. These two simultaneous evaluations facilitated a full and objective comparison of new and existing projects. Peer and SME project reviews (including participants from stakeholder communities such as Acquisition and T&E) determined that the majority of ongoing projects were very relevant to and merited transition to acquisition programs in support of the Warfighter; however, some were deemed to be lower priority than newer projects.

The Physical S&T program internally conducts technical reviews in a variety of venues. Internal management reviews are conducted periodically through site visits and communication between PIs and STMs, as well as quarterly and/or annual reports submitted by the PIs. Scientific peer panel reviews are conducted annually to assess technical quality of research, where PIs present project goals, activities, and results to independent peer review panels comprised of SMEs from government, industry, and academia. These panels assess projects for relevance and quality of effort. The results of these annual reviews are provided to PIs during site visits by the STM. Also, most Physical S&T projects are covered by TTAs and undergo TQRs to assess progress on the objectives and deliverables. These TQRs provide an opportunity for the STMs, PIs, and technology recipients to assess technical progress and discuss possible program modifications if warranted. As part of the annual program build, all projects are reviewed to determine if funding is to be continued. This review includes an evaluation of technical progress, quality of the work, and alignment with JPEO-CBD and JRO-CBRND priorities. For the FY 2010 programmatic build, projects selected for continued funding included 39 in Protection and Hazard Mitigation, 18 in Detection, and eight in Tests, Demonstration, and Integration.

The CBDP S&T Program is on track and represents a comprehensive and balanced portfolio, soundly positioned with a forward-looking orientation to deal with emerging and future threats.

Acquisition and Logistics

The JPEO-CBD provides layered, "defense in-depth" capabilities that address an expanded portfolio and a broader spectrum of threat agents, support the National Strategies, are dual purpose, transcend operational levels, and maximize return on investment (ROI).

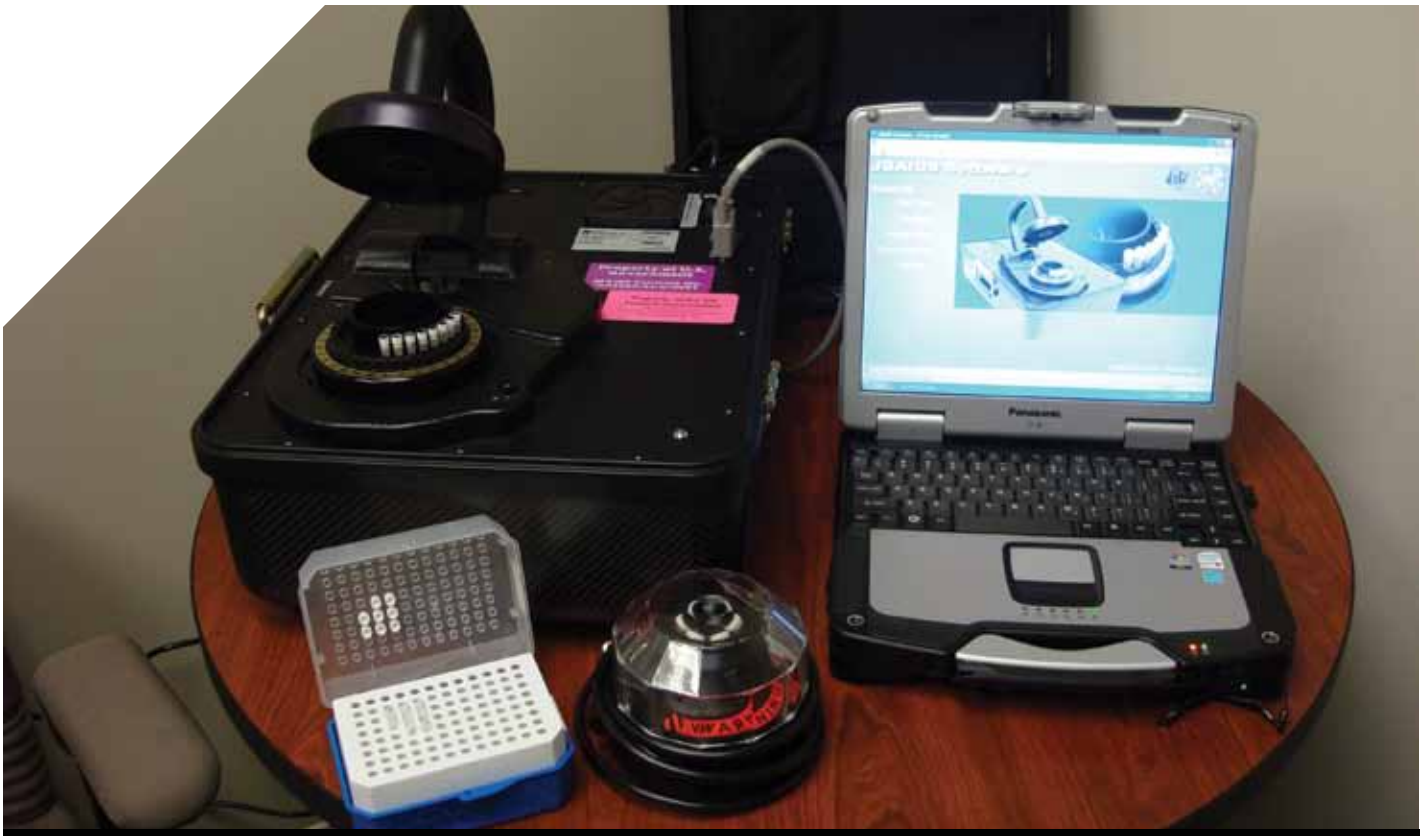
Joint Service Lightweight Integrated Suit Technology (JSLIST) with combat gear.

Acquisition

The focus of the JPEO-CBD acquisition strategy is to address the increasingly uncertain strategic environment that contains highly adaptive and intelligent adversaries with the ability to exploit technology and information to threaten the United States. This uncertain environment includes a broader array of threats today, including diverse hazards such as TICs and TIMs, as well as more potentially lethal threats in the future with the emergence of advanced/future chemical agents or reengineered biological agents. Furthermore, the Army assesses that the next several decades will be characterized by persistent conflict—protracted confrontation among state, non-state, and individual actors willing to use violence to achieve their political and ideological ends. Additionally, the budget climate is increasingly shaped by current and potential fiscal constraints while Congress and the President are committed to further reforming many of the fundamental ways DoD conducts its budgeting, acquisition, and procurement processes.

With uncertainty being the defining characteristic of the present and future environment, innovative solutions must be flexible to ensure that the U.S. Armed Forces are never technologically surprised. To mitigate the broadened threat context, the JPEO-CBD provides layered, "defense in-depth" capabilities that:

- **Address an Expanded Portfolio and a Broader Spectrum of Threat Agents:** The JPEO-CBD is undertaking efforts to develop defense equipment and MCMs for NTAs. One example of addressing a broader spectrum of threat agents is the TMTI's efforts to develop a single therapeutic that counters the effects of multiple biological threat agents.
- **Support the National Strategies:** The JPEO-CBD invests in developing equipment and capabilities that can support the full spectrum of national strategy "resource alternatives." This ensures that the equipment or capability is relevant within the full range of scenarios envisioned by the National Security, Combating Terrorism, CWMD, and Homeland Security/Defense strategies, as well as the *QDR*.
- **Are Dual Purpose:** Within the context of supporting the National Strategies, the JPEO-CBD invests in developing equipment and capabilities that are applicable to both major conventional operations abroad and the Homeland Defense Mission, providing integrated defense capabilities for Installation Force Protection and support to civilian authorities.



Joint Biological Agent Identification and Diagnostic System.

- **Transcend Operational Levels:** The JPEO-CBD invests in developing equipment and capabilities such as the JBAIDS, which confirms the identity of biological agents at the tactical level, provides a confirmatory analysis of biological agents for use at the operational level, and supports a strategic (national) bio-surveillance capability.
- **Maximize Return on Investment (ROI):** The JPEO-CBD maximizes ROI through international and interagency collaboration, developing capabilities through an Enterprise solution, reducing O&S funding, and maximizing Economic Order Quantities through purchasing.

Formal changes to the Defense Acquisition System are impacting the way that the JPEO-CBD manages its programs. The updated DoDI 5000.02, issued on December 2, 2008, includes new congressionally directed policy. The DoDI establishes a simplified and flexible management framework for translating capability needs and technology opportunities based on approved capability needs into stable, affordable, and well-managed acquisition programs. Regulatory and statutory changes promulgated by the new DoDI 5000.02 target the early phases of the acquisition development cycle, resulting in earlier involvement and additional R&D costs being incurred by the JPEO-CBD. There are new requirements for:

1. Robust analysis of material alternatives prior to initiating the acquisition process
2. Increased competition
3. Emphasis on systems engineering
4. Competitive prototyping
5. Evaluating and ensuring technology maturity so that our acquisition programs are ready for the next phase of development.

Implementing new DoDI 5000.02 requirements reduces technical risk, validates design and cost estimates, supports evaluation of manufacturing processes during the later stages of development, and helps to refine requirements.

Consistent with this strategic approach, in FY 2009 the JPEO-CBD continued the development and fielding of CB defense equipment and MCMs. Highlights of development and fielding efforts for FY 2009 are explained in this section, categorized within the four CBRN defense capability areas — sense, shape, shield, and sustain. In addition, this report describes efforts to support medical defense, homeland defense/consequence management, Major Defense Acquisition Programs (MDAP), and the JPEO-CBD's Software Support Activity (SSA). This section focuses on progress in the capability areas only during FY 2009, and does not list and define each JPEO-CBD system or equipment item as done in previous editions of the ARC. Readers may consult previous editions of the ARC at http://www.acq.osd.mil/cp/cbd.html. Provided on the next few pages are the accomplishments, innovations, and initiatives under each capability for FY 2009. Because several of the eight JPEO-CBD JPMs have broader product portfolios than others, their accomplishments, innovations, and initiatives appear greater in number.

Sense (Detecting, Identifying, and Quantifying CBRN Hazards)

Two JPEO-CBD JPMs are focused on providing systems in this capability area, the JPM-BD and the JPM-NBC CA. The JPM-BD creates and sustains affordable materiel solutions that accurately detect, identify, warn, deter, and defeat any biological threats to the Joint Forces. The JPM-NBC CA equips and sustains the Joint Forces with world-class CBR contamination avoidance products, capabilities, and services.

ACCOMPLISHMENTS

- The JPM-BD fielded 35 Joint Biological Point Detection Systems (JBPDS) to Army Reserve and National Guard units. The JPM-BD also installed 10 JBPDSs on 10 Navy surface ships. JBPDS provides a common detection and identification capability for joint interoperability and supportability.
- The JBSDS Increment I completed its final phase of multi-Service operational test and evaluation. The lead evaluator completed its System Evaluation Report and found the system to be effective and suitable with limitations. JBSDS provides stand-off detection of biological aerosol clouds for advanced warning, reporting, and protection.
- The Joint Biological Tactical Detection System Increment I and JBSDS Increment II successfully passed their MDDs. Both programs are scheduled for MS A in FY 2010 upon successful completion of the JRO-CBRND's AoA. The two products will fill capability gaps identified by the Joint Services and will provide the U.S. Armed Forces with a capability to counter future asymmetric threats and sustain a superior edge in biological defense.

INITIATIVE

- The JPM-BD initiated planning on a Biological Detection Roadmap to align the objectives and transition points for its PORs against the most critical Warfighter capability gaps and the most promising S&T efforts. The JPM-BD will use the Roadmap to collaborate with OGAs to develop cross-cutting products, such as the Common Identifier for Biological Analysis, to fill capability gaps for silver standard (i.e., preliminary analysis) biological detection in the area of medical diagnostics and environmental sampling. Confirmatory analysis is still required for a final determination.

Joint Biological Stand-off Detection System (JBSDS).

INNOVATIONS

- The JPM-BD initiated feasibility studies and acquisition planning for a JBPDS Build II (improved product). JBPDS Build II is an effort to augment or replace certain technology used in current JBPDS Increment I units. The JPM-BD's business case analysis supports an upgrade of the JBPDS detection and identification capabilities. There are new technologies that potentially offer greater detection and identification performance for a broader range of biological threat agents, and they can be operated and maintained at a lower cost to the Services.
- The JPM-BD completed the Technology Demonstration V for the JBSDS Increment II. Three candidate technologies from industry and the government sector demonstrated performance in various field environments. Analysis is ongoing to determine if the three technologies have the potential to satisfy the Warfighters' future requirements for an advanced biological stand-off detection capability. The candidate technologies offer stand-off detection capabilities in daylight, as well as nighttime, and robust algorithms for improved agent discrimination and false alarm rates.

Joint Biological Point Detection System (JBPDS) under camouflage.

ACCOMPLISHMENTS

- Joint Nuclear Biological Chemical Reconnaissance System (JNBCRS) Increment II: in response to a Joint Urgent Operational Needs Statement (JUONS), the JPM-NBC CA fielded to the U.S. Army 14 sets of mission specific kits for conducting dismounted (on-foot) CBRN reconnaissance. Specifically, this new capability includes the characterization of hazardous material events or accidents and WMD detection or denial operations. The JUONS-inspired product is the first phase of the JNBCRS Increment II that is scheduled for MS C in the second quarter of FY 2010.
- As of September 30, 2009, the JPM-NBC CA delivered 7,831 M4 Joint Chemical Agent Detectors (JCAD) to all Services including the U.S. Army Reserve. Naval and Army Special Operations units were the first to receive and use the most advanced hand held chemical agent detector in the DoD inventory. The JCAD maximizes efficiency by replacing two different systems, the M8A1 Automatic Chemical Agent Alarm and the M-22 Automatic Chemical Agent Detector Alarm.

INITIATIVES

- The CBRN Sensor Integration Working Group ensures that the sensor suite integration into the new Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV) is on track and coordinated. The Working Group keeps each sensor organization informed and aware of cost, schedule, performance status, and risks as they apply to the NBCRV program. This initiative includes the Program Management Office for Brigade Combat Team as well as the JPM-BD, JPM-IS, and JPM-ColPro.
- The CB Distributed Early Warning Strategy (CBDEWS) integrated technologies from PM Unmanned Aerial Systems, DTRA, ECBC, Army Research Laboratory, and numerous other CBDP internal and external organizations to demonstrate CB contamination detection, tracking, and warning in two demonstrations at Dugway Proving Ground (DPG). These events demonstrated the importance of integrated situational awareness for the Warfighter and provided the foundation for the next generation CB stand-off detection and early warning system.

Soldiers assigned to the 43rd Signal Battalion use M256 vapor-sampler kits to test for the presence of nerve, blood, and blister agents during annual CBRN training at the Heidelberg Local Training Area in Germany. (U.S. Army photo by Kevin Koehler)

INNOVATIONS

- Training: The NBCRV Virtual Crew Trainer (VCT) provides a crew level training system using virtual battle space. The system operates using America's Army Game system and incorporates the Force XXI Battle Command Brigade-and-Below cloned system for navigational and command computers. In addition, the instructor has the capability to create new scenarios and add items to the ongoing simulation, with after-action review/playback capability. It has four Stations: Instructor, Commander, Driver, and Surveyor. The NBCRV VCT also has a simulated Remote Weapons Systems that supports reconnaissance and target engagement capabilities. The NBCRV VCT was fielded to units and is being incorporated into the institutional training base at the Joint CBRN School. It provides NBCRV crew training while reducing the wear on the NBRCV systems, resulting in cost and support savings.
- The JPM-NBC CA is executing an engineering upgrade to the M256A1 Chemical Detection kit to standardize the method for detection of low volatility agents and to enhance field usability. The M256 is not an alarm; it is a tool used after personnel have received other warnings about the possible presence of CWAs. The new M256A2 kit standardizes the detection methods for solid and liquid phase agent samples and is backward compatible with the M256A1 kit. The A2 kit is Modular Lightweight Load-carrying Equipment compatible per feedback from Service users and incorporates replenishment of components to reduce user costs. Procurement of A2 kits will begin in the first quarter of FY 2010 and M256A1 kits will be replaced through attrition.

Shape (Characterize the CBRN Hazard to the Force Commander)

The JPEO-CBD's JPM-IS provides the Warfighter with integrated early warning capability, an accredited hazard prediction model, state-of-the-art consequence management, and course of action analysis tools.

ACCOMPLISHMENTS

- Joint Warning and Reporting Network (JWARN) Increment I and JEM Increment I (C2 Variant) completed their Multi-Service Operational T&E. Follow-on testing is scheduled en route to their Full Rate Production (FRP) decisions scheduled for FY 2010.
- Under the AUS/CAN/UK/US CBR MOU, the United States agreed to offer the JEM and JWARN Increment I to the other signatory nations in exchange for an independent evaluation of software functionality and coalition interoperability. International collaboration, such as the activities under the AUS/CAN/UK/US CBR MOU, results in maximum ROI for JPEO-CBD systems.

INNOVATION

Communications and Operability: The Common CBRN Sensor Interface (CCSI) Version 1.0, which standardizes interfaces between sensors and associated systems, was accepted as a mandated standard in the Defense Information Technology Standards Registry. All JPEO-CBD-developed CBRN sensors will interface using a published standard sensor interface. All JPEO-CBD-developed applications will be able to implement to the standard and guarantee interoperability between sensors and information systems.

INITIATIVE

The JPM-IS will continue to integrate shape capabilities to ensure a smooth flow of information from sensor alarm to hazard mitigation. The aim is to have a fully functional, enterprise, all-hazards capable, multi-echelon, multi-Service surveillance, warning, reporting, hazard prediction, hazard avoidance, and mitigation set of capabilities that may be used in tactical, expeditionary, and installation environments with the ability to cross into the Homeland Defense/Homeland Security realms. Realization of dual-purpose capability is a primary objective of the JPEO-CBD.

Joint Warning and Reporting Network System.

Shield (Shield the Force from Harm Caused by CBRN Hazards)

Two JPEO-CBD JPMs focus on providing systems in this capability area, the JPM-ColPro and JPM-IP. The JPM-ColPro provides stand-alone shelters and integrated systems which utilize state-of-the-art CBR protective technologies. The JPM-IP provides effective individual percutaneous, inhalation, and ocular protection against CB threats for our nation's Warfighters.

ACCOMPLISHMENTS

- The Joint Expeditionary Collective Protection program completed the Preliminary Design Review and began developmental testing.
- The Chemical and Biological Protective Shelter Program produced two full prototype systems and began building production representative units for First Article Testing.
- The Collectively Protected Field Hospitals (CPFH) Program completed the conversion of one Chemically Protected Deployable Medical System (CP DEPMEDS) to the Medical Re-engineering Initiative configuration. The CPFH Program also completed one new equipment-training event for the CP DEPMEDS.

Improving medical care of troops in a field situation.

Improved protection against CB agents in the field.

INNOVATION

- Initiated CATOX air purification technology integration into the Abrams M1A1 Main Battle Tank Test Bed. CATOX provides an enhanced capability to destroy CWAs and will provide dramatic improvements for protection against TICs. Additionally, CATOX may reduce logistics burdens.
- Initiated a study to integrate CATOX air purification systems onto shipboard applications as well as initiated design, fabrication, and evaluation to incorporate this technology into the Analytical Laboratory System glove box exhaust air.
- Initiated Limited Objective Experiment for Naval Quarantine and Isolation for transporting potentially contagious personnel and/or civilians.

INITIATIVES

- Initiated development of an integrated CB decontamination capability for the F-35 Joint Strike Fighter (JSF).
- Initiated ColPro system installations on board two amphibious ships through the ColPro System - Backfit Program.
- Initiated a plan to reduce lifecycle operations and maintenance costs by minimizing energy consumption of a ship's ColPro system via the Shipboard ColPro System Improvement Project.
- Initiated a fixed ColPro test bed effort to determine the levels of contamination infiltration of a fixed facility at different meteorological conditions and different protective architectures.
- Demonstrated a ColPro capability for the Naval Expeditionary Medical Facility through the CPFH Program.
- Initiated an analysis to determine the costs and benefits of current and emerging technologies for fixed-site ColPro.

ACCOMPLISHMENTS

- JC3 production began in the third quarter of FY 2009. The first 150 garments were delivered to the Army and Marine Corps in Fall 2009 with 15,538 being delivered thereafter. JC3 is a flame, petroleum, oil, and lubricant resistant semi-permeable garment that protects Warfighters against CB threats. It provides combat vehicle crewmen-specific capability and design that was previously unavailable.
- Fielded 146,186 Joint Service General Purpose Masks (JSGPM) in FY 2009. This mask replaces MCU-2P, M-40, and M45-series legacy systems. Considerable efficiencies are gained by having a single product or system replace multiple legacy products and systems.
- Delivered the following protective clothing components in FY 2009: Alternative Footwear System 471,282 pairs; Integrated Footwear System 54,330 pairs; JSLIST Block 2 Glove Upgrade non-Flame Resistant 292,185 pairs; and Joint Protective Aircrew Ensemble 18,184 garments. These components represent improved individual protection technologies for the Warfighter.

INNOVATIONS

- F-35 JSF cost saving benefits were realized by incorporating JSF pilot CBR mask protection requirements into a variant of the existing Joint Service Aircrew Mask-Fixed Wing program that uses proven technology and has a developmental schedule that meets the JSF program milestone.
- The Future Filtration effort is working collaboratively with industry partners, government agencies inside and outside the DoD, and private and government laboratories to effectively increase protection against several high priority TIC threats. Testing indicates that improvements against key agents may be demonstrated within the next 10-18 months. Interagency collaboration, as well as collaboration with industry, is a hallmark of JPEO-CBD operations and is required to advance technology to the required state.

Joint Service General Purpose Mask (JSGPM).

INITIATIVES

- Joint Service Aircrew Mask-Rotary Wing (JSAM-RW), Mask Protection Unit-6/P (MPU-6/P) Apache attack helicopter variant received FRP decision. The Apache variant of the JSAM-RW program replaces the M-43 and M-48 legacy masks. Considerable efficiencies are gained by having a single product or system replace multiple legacy products and systems.
- JPM-IP is cooperating with the National Institute for Occupational Safety and Health to certify the M-50 JSGPM for DoD civilian, contractor, and military first responder personnel to use for non-military unique situations during CBRN events.
- Collaborated with the Logistics Management Institute, adapted existing automated supply chain modeling software, and addressed complex lifecycle and industrial base management challenges associated with Individual Protective Equipment (IPE) portfolio items. Modeling provides a means to assess the ability of the industrial base to react to changing demands, transition to new materials and design changes, tariff modifications, etc., and is now used by the Defense Logistics Agency's (DLA) Clothing and Textiles Directorate for inventory management.
- A collaborative effort to rapidly develop and build new test methods to support the fielding decision for improved respiratory, ocular, and percutaneous protection against CWAs is underway between the JPM-IP, DUSA-TEO, Army Test and Evaluation Center, DPG, and ECBC. The rapid test development initiative will address testing capability gaps identified in recent acquisition programs, and it is currently on schedule for delivery in the next 12 months.

Sustain (Decontamination Actions that Enable the Quick Restoration of Combat Power)

The JPEO-CBD's JPM-Decon supports the Warfighter by providing a system of decontaminants and applicators specifically adapted to work together to decontaminate current and emerging threats with increasing efficacy while easing the logistics burden on operating Forces.

ACCOMPLISHMENTS

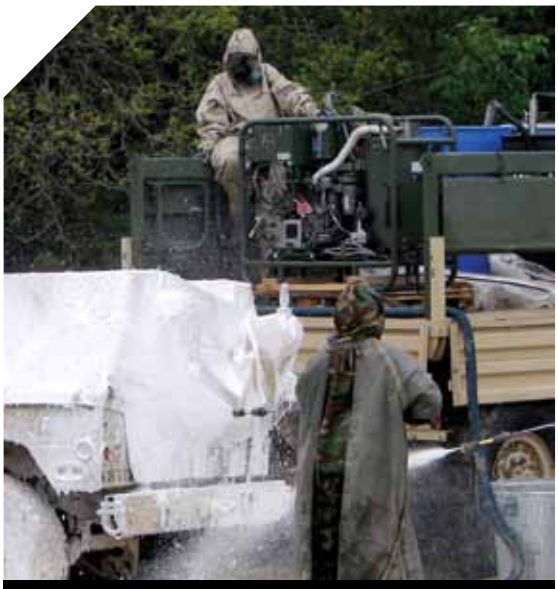
- In the first quarter of FY 2009, the Mortuary Affairs ICD was approved for use in the HRDS. In August of 2009, the HRDS program went to the MDA for a MDD. Subsequently, the JPEO-CBD approved the HRDS AoA Study Guidance. This decision authorized the program to enter into the Material Solution Analysis phase with MS A being the designated entry point. The HRDS will provide the capability to safely recover, handle, and transport contaminated human remains prior to decontamination at a Mortuary Affairs Decontamination Collection Point (MADCP); enable mortuary affairs units to safely perform their mission; fully decontaminate human remains (internal/external); and safely allow transport of decontaminated human remains from the MADCP to a final destination in the continental United States.
- The JSTDS-SS will begin fielding in FY 2010 and is on schedule to meet Initial Operational Capability in FY 2012. Additionally, JPM-Decon released a Request for Information to identify a lighter weight system that is capable of meeting the JSTDS-SS CPD requirements. The Request for Proposal for this initiative is scheduled to be released in FY 2010. The JSTDS-SS will be used to conduct operational decontamination missions and support thorough decontamination operations. It may also be used to support clearance decontamination missions, limited facility decontamination, and/or terrain decontamination.
- The Reactive Skin Decontamination Lotion (RSDL) continued fielding in FY 2009. RSDL is a FDA cleared, individually carried skin decontamination kit. RSDL provides the Warfighter with the ability to decontaminate the skin after exposure to CB warfare agents in support of immediate and thorough personnel decontamination operations. RSDL also provides the Warfighter with improved capability over the existing M291 Skin Decontamination Kit to reduce lethal and performance degrading effects of CWAs. RSDL neutralizes, as opposed to removing, the agent. Additionally, it can be used to decontaminate individual equipment, weapons, and casualties (unbroken skin only).

INNOVATIONS

- The JPM-Decon continued its solid working relationship with the JSTO-CBD in FY 2009. Two transitions are anticipated during FY 2010: Portable Decontamination System for Bio-Chemical Surface and Wipe Technology to the JMDS. In addition, three TTAs have been signed: HaMMER, IBRD, and Auto Decon. The deliverables in the TTAs are expected to transition to current and future PORs for potential advanced development during the FY 2010-2011 timeframe.
- In January 2009, the Decontamination FoS released a request for information for a decontaminant solution for the JSTDS-SS. The submitted products addressed either chemical and/or biological decontaminant capability gaps. Six of the original 19 submissions were recommended by an evaluation panel to move into Phase II testing. The decontaminant will address the capability gap associated with increased efficacy on porous materials, applicator compatibility, and logistics considerations.

INITIATIVES

- On May 8, 2009, the JPEO-CBD approved the Competitive Prototype (COPR) effort for the JMDS. The COPR effort will provide risk mitigation for JMDS (management umbrella for Joint Platform Interior Decontamination and Joint Service Sensitive Equipment Decontamination). Furthermore, the COPR will accomplish decontamination programmatic goals and risk mitigation for JSF per JROC approved requirements and USTRANSCOM objectives. The JSF Survivability requirement seeks external and interior/sensitive decontamination in preparation for Live Fire T&E.
- In support of the CBRN Small Product Acquisition (C-SPA) Program Manager (PM), the JPM-Decon coordinated with the National Guard Bureau (NGB) Decontamination Working Group and Commercial-Off-the-Shelf (COTS) Modernization (MOD) Integrated Product Team (IPT) SMEs in establishing a process for assessment of COTS equipment for a Tactical Decon System. This enabled the COTS MOD IPT to assess COTS equipment, provided the C-SPA PM a means to document the evaluation criteria, and supported the NGB decision-making process in prioritization of system procurement. The identified Civil Support Team's (CST) Tactical Decon System was rated as the highest priority for procurement in the FY 2009 COTS MOD process, and fielding will begin in the first quarter of FY 2010.



Joint Service Transportable Decontamination System-Small Scale.

Medical Defense (Medical Protection, Diagnostic, and Treatment Capabilities Against CB Warfare Agents)

The JPEO-CBD's JPM-CBMS uses government and commercial best practices to provide the Warfighter with safe (FDA-approved), robust, and affordable MCMs against a broad spectra of CBRN threats.

ACCOMPLISHMENTS

- Four JPM-CBMS programs initiated or completed Phase I clinical trials in FY 2009. The Bioscavenger II Program, recombinant Botulinum A/B Vaccine Program, and the Medical Radiation Countermeasure Program (Cleveland BioLabs) completed Phase I trials in FY 2009. The Dry Powder Inhalation Atropine Program initiated a Phase I clinical trial. These programs are being developed to protect against or treat a broad spectrum of agents to include traditional and NTAs. Phase I clinical trials are first time in human studies that prove the initial safety of the product. Successful completion of a Phase I clinical trial satisfies the MS B requirement that the product has been initially tested in a relevant environment, in this case a human.
- The Advanced Anticonvulsant System Program initiated a Phase II clinical trial in FY 2009, as did the Recombinant Botulinum A/B Vaccine Program. The Phase II clinical trial for the Plague Vaccine Program is ongoing. Phase II clinical trials show expanded safety and efficacy (via the Animal Rule) of products needed for FDA approval.
- Two JPM-CBMS programs submitted IND applications to the FDA in FY 2009: the Improved Nerve Agent Treatment System (INATS) and the Medical Radiation Countermeasure program (CLT008). The INATS Program was the second DoD organization to submit their IND electronically, saving both time and money.
- Regarding the JBAIDS, DoD submitted an Emergency Use Authorization (EUA) to the FDA for the H1N1 Pandemic Influenza A Assay. This effort was executed at the request of the CDC and allowed the DoD to aid in a public health crisis. The FDA approved this submission at the end of FY 2009. Work on the H5N1 (Avian flu) assay was initiated in FY 2009 and will be complete in early FY 2010. An EUA authorizes the use of unapproved medical products or unapproved uses of approved medical products during a declared public health emergency. Under this new EUA, the DoD's JBAIDS can be used to run the CDC's test, which will aid in more rapid diagnosis of H1N1 influenza infections so that deployed troops can quickly begin appropriate medical treatment.
- The Filovirus Vaccine program completed a MDD with the JPEO-CBD in August 2009. Five out of the 14 total TTAs developed and approved by the JPM-CBMS and the tech base support this effort. Filovirus Vaccine candidates will transition to advanced development in FY 2010.
- The JPM-CBMS continued fieldings of four different products in FY 2009: provision of 1,400,000 doses of Anthrax Vaccine Adsorbed; 360,000 doses of smallpox vaccine; and 320 doses of Vaccinia Immune Globulin, as well as retrofit of 268 JBAIDS systems.
- The Critical Reagents Program (CRP) obtained International Organization for Standardization (ISO) 9001 registration as well as ISO 17025/34 compliance for support laboratories. During this time, the CRP continued to make more than 200 products supporting multiple interagency and intra-agency requests and nine foreign governments.

INNOVATIONS

- The JPM-CBMS continues work to incorporate item unique identifiers (IUID) into developmental programs as well as fielded products that will decrease the logistical footprint of medical products. IUID plans are now required prior to MS A (based on DoDI 5000.02). The JPM-CBMS logistics team is preparing plans for: Bioscavenger II, INATS, Medical Radiological Defense, and Inhalation Atropine. In addition, the JPM-CBMS is exploring the possibility of combining time temperature indicators (TTI) with IUIDs. TTIs reduce life cycle costs and increase Warfighter confidence in fielded medical products.
- The JPM-CBMS, in collaboration with the Biological Advanced Research and Development Authority (BARDA), continues to explore the DARPA's Accelerated Manufacture of Pharmaceuticals (AMP) technology. Initial studies will be conducted with the Bioscavenger program; however, this technology could potentially be used for all vaccines and therapeutics.
- The JPM-CBMS continues to partner with the DARPA to use the MIMIC technology developed through the RVA tool by VaxDesign. This technology is an *in vitro* assay that mimics the human immune response. The technology would be useful for developing beneficial vaccine immune responses, reducing the risk of first time use in human clinical trials, and decreasing life cycle costs for the program.
- The JPM-CBMS continues to incorporate enhancing technologies into the vaccine/therapeutic programs. Multi-dose formulation, increased product stability, and alternative drug delivery technologies will save time, decrease life cycle costs, and decrease the logistical burden for medical programs.

INITIATIVES

- The JPM-CBMS continued to support the Army-wide implementation of Lean Six Sigma by initiating four new projects in FY 2009. These projects will improve processes and procedures for the Congressional Special Interest Programs (CSIP), improve risk management within the JPMs, improve the Regulatory and Quality Assurance Program, and define IPT roles and responsibilities.
- CSIPs: The JPM-CBMS shapes CSIP projects accepted into the organization to support its current mission profile. CSIP projects are not JPM-CBMS PORs; rather, they are projects specially funded by Congress for CBRN MCM R&D. Before these projects become a part of the JPM-CBMS management portfolio via its Broad Agency Announcement, project proposals undergo a rigorous assessment process in which SMEs ensure project alignment with JPM-CBMS missions, resulting in a positive outcome for stakeholders. Partnerships with CSIP recipients allow the JPM-CBMS to gauge the pulse of emerging technologies while providing mentoring and insight into the DoD acquisition process.
- The JPM-CBMS maintains key partnerships with government, industry, academia, and international partners. Collaborating with the CDC on the Strategic National Stockpile (SNS) of the Smallpox and Anthrax Vaccines has saved the DoD $50M over a two-year timeframe. More than $122M will be saved by the DoD through interagency and international collaboration of the Plague Vaccine Program and the Medical Radiation Countermeasure Program. The JPM-CBMS signed six Memoranda of Understanding (MOU)Memoranda of Agreement/Interagency Agreements in FY 2009 with various organizations to collaborate on MCM development/management.
- The JPM-CBMS and the JSTO-CBD closely coordinate the development of CTAs and TTAs. The JPM-CBMS and JSTO-CBD met on a quarterly basis in FY 2009 as part of the TQR process to review tech base projects for each capability area (Therapeutics, Prophylaxis, and Diagnostics). CTAs/TTAs are developed for all 6.3 funded programs (RDT&E, Advanced Technology Development) or promising 6.2 funded programs (RDT&E, Applied Research) independent of the status of Advanced Development funding. These agreements will be in place prior to transition of the program to Advanced Development under the JPM-CBMS. To date, 14 CTAs/TTAs have been signed. The TQR process gives the advanced developer technical information about the programs and the required insight to program funds for transition. This close coordination is an industry best practice and allows for seamless product transitions from the tech base to the advanced developer. Six CTAs/TTAs were signed for future capabilities in FY 2009.
- The JPM-CBMS continues to collaborate on the Rapid Anticonvulsant Medication Prior to Arrival Trial study with the National Institute of Neurological Disorders and Stroke and the University of Michigan. In exchange for efficacy data from the study (estimated at $23M), the JPM-CBMS has supplied auto-injectors and training materials ($1.5M) and information for the Chemistry Manufacturing Control portion of the IND, as well as a cross-reference letter to the JPM-CBMS IND. This collaboration benefits both the DoD and the DHHS.
- In response to the request from the Homeland Security Council for the DoD and the DHHS to integrate their medical TRLs, the JPM-CBMS, the JSTO-CBD, the BARDA, and the NIAID integrated their respective TRLs into a single list. These updated, integrated TRLs set forth the guidelines to facilitate common, effective, and timely assessments of medical technologies and technical information developed by DoD and DHHS. JPM-CBMS has also initiated discussions to develop a consolidated Manufacturing Readiness Levels list across the different agencies.

Homeland Defense/Consequence Management (Systems in Support of Installation Defense and Homeland Security Requirements)

The JPEO-CBD's JPM-Guardian provides CBRN defense capabilities for Homeland and Installation Defense, as well as Vigilant Protection and Initial Response for the DoD's Critical Infrastructure and Civilian Support.

INNOVATIONS

- The JPM-Guardian partnered with the JPM-IS to develop a next generation Decision Support System (DSS) that focuses on the Emergency Operations Center to Incident Command Post interface and integrates DoD and DHS policy, guidance, and instructions. The DSS has the capability to expand the JPEO-CBD enterprise solution by incorporating not only CBRN capabilities, but also Physical Security/Force Protection capabilities with an all-hazards solution set that facilitates National Incident Management System (NIMS) compliance on DoD installations.
- The JPM-Guardian chaired the TIC/TIM Task Force. The Task Force mission identifies TIC opportunities and gaps within the COTS/government off-the-shelf Portfolio. Preliminary information for the task force was presented to the NATO Challenge Sub-Group in July 2009.
- The JPM-Guardian designed and implemented a COTS JACKS Information Tool, which provides integrated search capability across multiple databases internal and external to the DoD. It represents a single fused source of information based on a person's Common Access Card credentials (i.e., need to know) of CBRNE commercial equipment. The tool provides a seamless capability to view testing, doctrine, logistics, and training information across both databases and disparate systems.

Decontamination of Soldiers following a CB exposure exercise.

ACCOMPLISHMENTS

- On February 27, 2009, the JPM-Guardian established the new Joint Product Manager, Joint Operations Support CBRNE, to rapidly procure, integrate, and sustain all CBRNE capabilities for the Army's 20th Support Command (SUPCOM) (CBRNE) in support of their Warfighter and Homeland Defense missions.
- The JPM-Guardian completed the fielding of the Analytical Laboratory System Increment I upgrades to each NGB WMD-CST, providing the CSTs with an advanced orthogonal capability to detect CB WMD and TICs. The JPM-Guardian fielded a Transportable Communications Package/ Advanced Echelon vehicle to the 29th Infantry Division. In support of the 20th SUPCOM, the JPM-Guardian fielded a light version of a Mobile Analytical Laboratory, and began the design of a heavy version and a monitoring van, giving the 20th SUPCOM a capability for rapid on-site sample identification and the ability to correctly detect and identify WMDs in a tactical environment.
- The JPM-Guardian fielded tiered CBRN protection and response capability to an additional 12 Continental United States (CONUS) military installations and completed design activities for the first Tier II Outside of the Continental United States (OCONUS) installation.

INITIATIVES

- The JPM-Guardian partnered with the DTRA to sponsor Military-Civilian Coordination Advisory Group meetings which facilitate discussions, share lessons learned, and develop best practices for local preparedness and response activities between civilian jurisdictions and military facilities and installations. JPM-Guardian participated in two successful meetings: the first took place in Seattle, WA and the second in San Antonio, TX.
- The COTS technology life cycle management (LCM) program established with the U.S. Army TACOM Life Cycle Management Command (TACOM LCMC), Rock Island, was the first WMD COTS technology for Military use, providing a single point of management for CBRN COTS LCM across the CBDP and other federal agencies. It strives to standardize, modernize, and institutionalize COTS equipment to optimize benefits/savings to the DoD, and it facilitates planning, budgeting, and scheduling for long-term COTS modernization.
- The JPM-Guardian is collaborating with the DTRA, JSTO-CBD, and JPM-NBC CA on the Rapid Area Sensitive-Site Reconnaissance ATD. This ATD will demonstrate a sensor capability for NTAs, CWAs, TICs, and explosives that is mountable on a remote controlled mobile platform capable of sending real-time color video feed to the operator. The JPM-Guardian also plans to transition the sensor-robot system to tunneling applications as well as the use of networked robotics for CBRNE and Force Protection functions.
- The JPM-Guardian, its PM Installation Protection Program, and military installation response personnel participated in exercises with local responders, Public Health, and BioWatch officials. Within the National Capital Region (NCR), they tested combined notification CONOPS and worked through a bio-event Table Top Exercise (TTX). In San Diego, CA, the team conducted combined informational meetings. All of these efforts enhanced local cooperation and built confidence in a combined response to biological threats. The exercises help establish the foundation for a successful National Biomonitoring Architecture.

Major Defense Acquisition Programs Support

CBRN requirements have traditionally been viewed as a series of separate items resulting in individual CBRN equipment products rather than a system of systems (SoS) approach to CBRN defense that captures synergy and leverages multiple materiel solutions. The traditional approach provides a capability, but it also places a burden on the Warfighter and increases the requirements for dedicated platforms and operators. MDAPs, such as the Air Force's JSF, do not allow for dedicated force structure to deal with CBRN defense. Therefore, the JPEO-CBD is developing enterprise products that can be integrated into the fighting force. These products assist commanders in focusing on their primary mission unencumbered by CBRN hazards.

Software Support Activity

The JPEO-CBD understands the technical complexities associated with information technology (IT) aspects of the CBRN defense SoS approach. Accordingly, the JPEO-CBD established the SSA. The SSA is organized around the areas of architecture, data, information assurance, standards and policy, M&S, and S&T transition.

Tina Slade and Jennifer Tanyatanaboon prepare a F-16 Fighting Falcon for a biological contamination trial which will assess CB survivability of the future jet by testing decontamination processes on a retired F-16 Fighting Falcon. (U.S. Air Force photo by Jeffrey Youngblood)

An Airman with the Joint Strike Fighter Integrated Test Force sprays down an F-16 Fighting Falcon before its final chemical decontamination test. The goal of the testing is to decontaminate an entire aircraft quickly and return it to service. (U.S. Air Force photo by Mark McCoy)

ACCOMPLISHMENTS

- Awarded contract to develop and test chemical sensors (i.e., JCAD and Joint Lightweight Stand-off Chemical Agent Detector) to meet ground platform requirements. Anticipated design completion for delivery and integration into identified MDAP platforms is expected in the second quarter of FY 2011.
- Provided technical expertise to the Soldier as a System – Ground (SaaS-G) ATD. SMEs from sensor and individual protection commodity areas provided input into the conduct of the ATD. The JPEO-CBD will use this experience to assist the SaaS-G PO in designing solutions to meet their requirements.

INNOVATIONS

- Initiated prototype of decontamination system to support the JSF. This design will look at new decontamination technologies, along with different applications of shelter technology, to provide the JSF program with the best decontamination capability to achieve their survivability requirements.
- Refining CCSI requirements. The goal of CCSI is to create an open system giving sensors the ability to plug-and-play into MDAP platforms. The standard will allow sensor designers to ensure that the products that JPEO-CBD is providing to the MDAPs will be compatible with the network requirements levied by the MDAPs.

INITIATIVES

- Conducting DSS TTX for maneuver support to obtain user buy-in on overarching requirements for DSS. The DSS TTX will allow the commander to have more information at hand to make an informed decision on how the unit should mitigate a CBRN attack. This TTX will allow the JPEO-CBD to generate detailed requirements for inclusion into a future acquisition program.
- Developing a naval ICD to outline top-level Navy requirements for CBRN defense. Once accepted, this naval ICD will allow JPEO-CBD to decompose the ICD and corresponding CONOPS to better design CBRN SoS solutions for the naval environment.

Summary of Acquisition Approach

JPEO-CBD acquisition is based on systems engineering principles that field net-centric, modular, tailorable, and multi-purpose capabilities across the entire portfolio. The procurement or modification of commercially available products or technologies from domestic or international sources is the preferred approach to provide a materiel solution. Acquisition strategies based on new DoD-unique development efforts are last resorts when closing gaps with a materiel solution. Preference is given to building evolutionary acquisition strategies in response to approved, time-phased capability needs matched to available technology and resources. Full and open competition with contract incentives, competing prototypes, leveraging of commercial investments, and applying government technology advances underpin the JPEO-CBD's efforts to attain strategic acquisition excellence and reduce overall program risk. Within a LCM framework, performance-based support strategies and business case analyses direct outcomes toward reducing total ownership costs. This aligns resources to achieve the highest possible system availability and readiness levels after total package fielding.

The JPEO-CBD builds collaborative and innovative acquisition strategies that develop and deliver interoperable, affordable, and flexible Joint Warfighting tools. Overarching precepts related to the desired outcomes include:

- Rapidly delivering capabilities
- Exploiting national and international technology opportunities
- Integrating acquisition and life cycle management
- Promoting competition
- Reducing cycle time and total ownership costs
- Improving logistics support
- Ensuring tactical acquisition excellence
- Fielding safe, suitable, sustainable, and effective capabilities.

The JPEO-CBD has put people, systems, processes, initiatives, and tools in place to effectively and efficiently integrate and implement acquisition strategies across the functional disciplines of:

- Program management
- Systems engineering
- Logistics
- Financial management
- T&E
- Technology
- Information assurance
- Contract management.

The goal is to define, analyze, evaluate, and optimize the systems within the CB defense portfolio of systems to adequately protect our Warfighters while minimizing performance degradation and enabling their ability to carry out their critical missions. These initiatives include:

- Portfolio Management to analyze and collectively manage a group of current or proposed projects based on numerous key characteristics.
- A SoS approach, where a collection of task-oriented or dedicated systems pool their resources and capabilities together to obtain a new, more complex "system," which offers increased functionality and performance than simply the sum of the constituent systems.
- Architecture products and the associated techniques that are used as tools for defining and analyzing inter-system interactions. The JPEO-CBD has several architecture and architecture-based initiatives underway, which will help identify and comprehensively frame system-of-system problems, identify alternative solutions, analyze and evaluate those alternative solutions, and ultimately recommend a specific course for effectively addressing the underlying problem.

ACCOMPLISHMENTS

- Provided technical leadership for establishing the CBRND Community-of-Interest. Its objective is improving the efficiency and effectiveness of data interoperability both within the CBRN defense community and between the CBRN defense and adjacent communities.
- Completed Integrated System Architecture packages for defining, with engineering precision, the interfaces and interactions of each system in the CB defense portfolio with other CB defense and with external systems.

INNOVATIONS

- Developed an Integrated Enterprise Architecture providing the engineering basis for leading the entire portfolio as a tightly integrated SoS capability.
- Developed, implemented, and monitoring a standardized approach, tailored to unique CBRN defense considerations, for meeting the DoD Net-Centric mandate resulting in a standard "look and feel" for all CB defense systems.

INITIATIVES

- Led the development of the CBRN defense M&S Strategic Plan, a critical initiative to synchronize M&S across the entire community.
- Provided technical leadership to migrate the CCSI Standard to a recognized industry standard, thereby increasing its utility and applicability.

Joint Logistics

Our Enterprise solution pursues meaningful, affordable, and jointly sustained increments of capability to ensure technological superiority against an expanding array of CBRN defense threats. To support this Enterprise-wide approach, our strategy provides "just in time" modernization and the supporting business processes to integrate complementary technologies into a seamless operational and support environment. Our sustainment strategy uses dual-use technologies, providing capability for both the National Defense and Homeland Defense missions.

The JPEO-CBD modernizes the Force's CBRN capabilities and standardizes Joint Sustainment Strategies. The JPEO-CBD's strategy for standardization decreases costs and increases readiness and preparedness across the U.S. Armed Forces.

Joint Service Lightweight Integrated Suite Technology with combat gear.

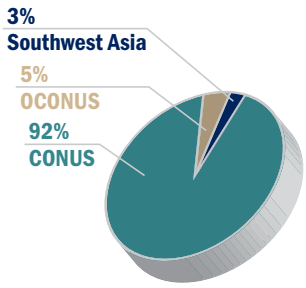
ACCOMPLISHMENTS

- Joint Materiel Release (JMR): The JMR Program was developed and implemented to ensure that all CBDP systems are safe, suitable, effective, and supportable. In its first two years of implementation, the JMR has proven its effectiveness and value. As part of the JMR Program, an Automated Joint Independent Logistics Tool was developed and fielded in 2009. The Joint Independent Logistics Assessments (JILA) Tool automates the overall JMR process. Benefits of the JILA Tool include improvements in communications, collaboration, assessment efficiency, and historical data maintenance. As of August 2009, 29 acquisition programs successfully underwent JILAs.
- The Joint Equipment Assessment Program (JEAP): The JEAP Defense Accountability, Reutilization, and Disposal (DARD) Project provides efficient and cost effective collection, assessment, preparation, and reutilization of serviceable CBRN defense clothing and textiles. The JEAP DARD Program further ensures proper demilitarization of unserviceable CBRN defense equipment and maintains an accurate account for all designated excess/unserviceable CBRN defense equipment. In FY 2009, the JEAP DARD program recovered more than 3.9 million line items and facilitated the disposal of 3.5 million line items in accordance with the *Defense Demilitarization Manual* (DoD 4160.21-M-1). Additionally, there were 377,000 line items reutilized for training or returned to service for an annual cost avoidance of $16.5M.
- JEAP Surveillance and Shelf Life: In FY 2009, the JEAP Surveillance and Shelf Life process tested more than 144 JSLIST lots and 35 chemical protective glove lots resulting in a cost avoidance of more than $9M.
- Total Asset Visibility (TAV): The JACKS-RW continues to grow as the all-Service single point of entry for access to CBRN defense system information. While additional steps are required to achieve complete automation of asset visibility, this year marks a significant effort by all Services and the DLA towards the goal of achieving CBRN equipment TAV for the CBDP. The report reflects continued progress toward complete automation of TAV and includes all available automated CBDP inventories of consumable and non-consumable products. The CBDP continues to monitor progress with the goal of achieving 100 percent Service reports of the CBRN items for which they have requirements/inventories. Additional equipment information, including condition, shelf life, and detailed quantities within each of the categories in the roll up above, can be viewed by accessing the JACKS at: https://jacks.jpeocbd.osd.mil/secure/default.aspx. Non-users must request access to this website, as this information is For Official Use Only. Approval is normally granted within 24 hours.

INITIATIVES

- Materiel Fielding Tracking Tool: The JPEO-CBD is the Materiel Release Authority for all CB defense programs for which it is the Materiel Developer. The Materiel Fielding Tracking Tool (MFTT) supports this process and assists JPEO-CBD product fielding by:
  - Standardizing the data structure and reporting periods across the eight JPEO-CBD JPMs
  - Creating a standard, authoritative data source to record all materiel fieldings and transfers in accordance with the Total Package Fielding requirements contained in Army Regulation 700-142, "Type Classification, Materiel Release, Fielding and Transfer"
  - Greatly reducing the time spent by analysts and fielding personnel to compile reports and provide senior leaders with timely and accurate information. The MFTT software is hosted on JACKS.

  The combination of capabilities provided by the MFTT will help to ensure that JPM fielding, product distribution, and accountability information are visible and readily available. The MFTT will provide the JPMs automated visibility and traceability of all JPEO-CBD assets that are procured and fielded. Additionally, users will be able to create queries in "near-real-time" to answer logistics-related questions on CB Defense fielding and new equipment training for various organizations.
- CBRN-Information Resource Center (CBRN-IRC): The CBRN-IRC operates on a continuous basis and serves as a single entry point for all requests for information related to the CBDP; it can be accessed online or via telephone by Service personnel throughout the world. Through a collaborative effort between the JPEO-CBD and support agencies (i.e., the TACOM LCMC's Integrated Logistics Support Center, Product Support Integration Directorate, and ECBC) the CBRN-IRC continues to evolve to meet the JPEO-CBD's intent to integrate seamlessly and provide responsive, relevant, and reliable information to support the Warfighters. This feature has been highly acclaimed by our Stakeholders and continues to grow in content and demand. CBRN-IRC inquiries totaled 2,554 in FY 2009 (32 percent increase from FY 2008).
  - Total inquires: 2,554 (32 percent increase from 2008)
  - Average customer rating: 4.8 (scale: one is worst, five is best)
  - Inquiry Origins:



  - Seventy-one percent of all inquires are closed within 24 hours; more than 76 percent are closed within 72 hours.

INNOVATION

- Since its establishment in June 2003, the JPEO-CBD continues to evolve its approach for Enterprise-wide engagement in LCM. Within a cooperative framework established through the Joint Logistics Advisory Council for Chemical and Biological Defense, the JPEO-CBD supports the Operations and Support phase of the Systems Acquisition process to improve readiness and fielding of equipment, while respecting the Services' ultimate and statutory responsibility and authority to train, equip, and sustain the Force. The JPEO-CBD executes a three-fold approach to improve the logistical readiness of the DoD's CB Defense equipment:
  - Continue and improve the organizational relationships and structures within the CBDP
  - Implement and institutionalize several Business Process Improvements to enhance and streamline Joint Sustainment
  - Integrate efforts and processes through the use of IT systems that improve the JPEO-CBD's decision support tools, facilitate the sharing of critical logistics information to all Stakeholders, and enhance CB equipment visibility across the Joint Forces.

Chemical and Biological Defense Program Product List

A very important measure of the CBDP and the JPEO-CBD is the number of new capabilities developed and fielded. The CBDP fielded more than 1.3 million items in FY 2009. The table below depicts FY 2009 fielding quantities and recipient Services.

FY 2009 Fielding Quantities

JPM	System	Services Fielded					TOTALS
		ARMY	AIR FORCE	NAVY	MARINE CORPS	USSOCOM	
JPM-Decon	JSPDS (RSDL)	136,080	18,720	55,200	27,600	0	**237,600**
	JSPDS Training Lotion	8,400	0	0	0	0	**8,400**
JPM-NBC CA	ACADA/M22	47	0	0	0	0	**47**
	ICAM	1,155	0	0	0	0	**1,155**
	JNBCRS-2	18	0	0	0	0	**18**
	JCBRAWM	53	0	100	0	0	**153**
	JCAD	2,274	1,335	1,879	1,703	0	**7,191**
JPM-BD	JBPDS	407	0	35	0	0	**442**
JPM-ColPro	No Fieldings	0	0	0	0	0	**0**
JPM-CBMS	JBAIDS	0	0	11	0	0	**11**
JPM-Guardian	ALS 1	48	0	0	0	0	**48**
	IPP	3	3	5	1	0	**12**
JPM-IP	JSGPM	0	99,976	0	50,000	0	**149,976**
	AFS	140,953	231,745	50,280	118,840	0	**541,818**
	IFS	0	0	36,036	0	30,182	**66,218**
	JB2GU nFR	89,072	87,039	41,255	63,071	0	**280,437**
	JSMLT	0	65	15	0	0	**80**
	JPACE	14,111	0	20,486	0	0	**34,597**
JPM-IS	JEM Increment I (Standalone)	0	71	0	0	0	**71**
	TOTALS	**392,621**	**438,954**	**205,302**	**261,215**	**30,182**	**1,328,274**

Joint Chemical Agent Detector.

Industrial Base

The CBDP continues to strive to increase the visibility of the CBRN industrial base (IB) status, and the risk associated with the IB in the event of a CBRN incident or a national emergency. To support this visibility, an Industrial Base Analysis System was developed. The IB continues to be challenged by fluctuations between times of war and times of peace, which result in fluctuations in both the demand and production requirements. To address this concern and ensure the availability of CBRN systems as required, the JPEO-CBD tasked the Joint Logistics Advisory Council for Chemical and Biological Defense IB Working Group to conduct a scenario-based analysis on CBRN systems to identify risks and potential mitigations strategies for the JPEO-CBD to accomplish its mission in times of surge and national emergency.

The impact of this IB analysis and management is an integral part of the JPEO-CBD's Total Life Cycle Management philosophy for enterprise-wide management of this critical commodity.

ACCOMPLISHMENTS

- This initial IB analysis was conducted using 224 systems supported by a total of 348 National Stock Numbers identified in the TAV list generated by the OATSD(NCB/CB).
- The systems are compiled according to their core capability alignment, as this alignment provides the linkage needed to determine an overall IB capability assessment rating. A total of 19 core capabilities are being reviewed during this initial analysis.

INNOVATIONS

- This IB analysis has identified nine major focus areas: supply availability, production status, lead time, shelf life, vendor base, foreign source, production viability, financial status of contractors, and debarred status of contractors.
- This analysis demonstrates the feasibility of conducting an assessment that is based on *quantifiable*, *verifiable*, and *repeatable* data that is linked to the Passive Defense Mission area, greatly improving the understanding of CBRN equipment availability and IB status and capacity.

INITIATIVES

- A two-phased approach is being used to accomplish the IB analysis. Phase one is the initial short term analysis to identify risks.
- Phase two identifies a long term, standardized approach and mitigation strategy to improve IB management. Phase two will be out-briefed in January 2010 and included in the next ARC.

Assessment

The JPEO-CBD continues to utilize the Defense Acquisition Executive summary format to report the acquisition status of the programs monthly. The 42 acquisition programs (including PD-TESS) include programs that are post-FRP and pre-system acquisition. Of these programs, there are 14 active Acquisition Program Baselines (APB). APBs are used to manage the cost, schedule, and performance throughout the Engineering and Manufacturing Development Phase of the acquisition process leading to the FRP decision review. The programs that are post-FRP or pre-system acquisition do not have active APBs. For FY 2009, five APBs will be updated as a result of successful acquisition decision reviews.

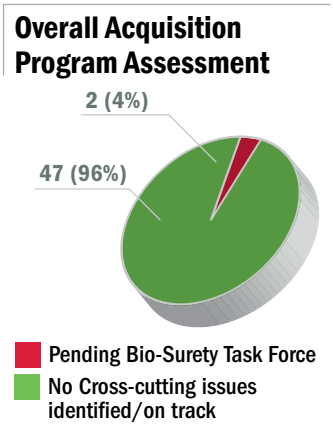
Within the DoD acquisition system, the JPEO-CBD is the designated MDA for all CB defense acquisition programs. Overall success of the acquisition programs is measured in terms of fielding additional or new capabilities to the Warfighter. For FY 2009, of the 42 acquisition programs (including PD-TESS projects) reported monthly, four programs received successful acquisition decisions that authorized equipment fielding to the Warfighter. These are in addition to the 19 programs of the 42 that are presently fielding capabilities.

The JPEO-CBD, in coordination with the JRO-CBRND and Joint CBRND PAIO, has embraced the new DoDI 5000.02, dated December 2, 2008, which revised the acquisition life cycle framework. As stated earlier in this report, the new DoDI 5000.02, increases emphasis on upfront planning and coordination, system engineering, technology readiness, and capability refinement. The new acquisition cycle framework incorporates MDDs prior to Milestone Decision reviews. The MDD allows the MDA to review the technology maturity and capabilities prior to determining the milestone entry point of a system. As of FY 2009, the JPEO-CBD conducted six successful MDDs across the CBDP portfolio. This new process should allow the MDA to field a more refined and risk-reduced capability to the Warfighter.

This section will assess cost, schedule, and performance based on the following definitions:

- Green: No cross-cutting issues, i.e., cost, schedule, or performance issues that cut across programs
- Yellow: Cross-cutting issues with identified resolution within established processes
- Red: Critical issues that require GO/FO resolution.

Overall Acquisition Program Assessment – Green: No Cross-Cutting Issues Identified/On Track



Cost – Green: No Cross-Cutting Issues Identified/On Track
As mentioned in the FY 2008 ARC, potential cost growths to the medical portfolio still remain as a result of the U.S. Army's Bio-surety Task Force reviewing the bio-surety, biosafety, and personnel reliability for two of the programs. All other cost issues for individual programs are addressed within the CBDP and reflected in APB updates during decision reviews.

Schedule – Green: No Cross-Cutting Issues Identified/On Track
Systems are being procured and fielded on time. No cross-cutting issues exist within the 14 reported programs with active APBs.

Performance – Green: No Cross-Cutting Issues Identified/On Track
The CBDP continues to field militarily significant increments of capability with no performance issues that cut across all of the acquisition programs. Individual acquisition program-specific performance challenges are addressed within the CBDP and reflected in APB updates during decision reviews.

Test and Evaluation

The dynamic nature of emerging CBRN threats challenges the capability of existing T&E infrastructure, which must continually adapt to test and evaluate advanced technology systems against evolving threats in operationally realistic environments.

To promote testing efficiencies within the CBDP, it is imperative to cultivate synergy and interaction among S&T and T&E communities. S&T facilities play a critical part in developing test methodologies to go along with new technologies under development. Utilizing commercial labs and facilities will be considered in assessing overall T&E infrastructure capability needs and test workload. This will allow the Program to get the best value with limited resources. General T&E standards that must be adhered to for any facility to conduct testing, including commercial facilities, are in place for the CBDP, and the T&E community is currently working to establish many individual test procedures and standards for specific tests. Early involvement by testers and evaluators is key in gaining an understanding of the science and advancing technologies being developed and critical for determining T&E infrastructure requirements of the future.

For this approach to work, test standards are required that ensure consistent and repeatable test results of agent test data from laboratory tests and simulant test data from field tests. This data can then be used with confidence to validate models. The key is to ensure that T&E can support analysis of operational effectiveness and mission success to inform fielding decisions. This process begins with the AoA, which evaluates the performance, operational effectiveness, operational suitability, and estimated costs of alternative systems to meet a mission capability. The results of the AoA identify mission parameters that drive test scopes and infrastructure requirements for the selected technologies.

Surety testing of CBDP systems requires generation and control of BWAs/CWAs in facilities designed to contain these agents without risk of personnel or environmental hazards. These facilities must also meet regulatory and legal requirements for handling BWAs/CWAs. Outdoor testing is based on the use of simulants, which are first shown to be safe for open air release and correlated with the BWAs/CWAs. Both types of tests require specialized personnel, facilities, instrumentation, and methodologies, which are developed specifically for each type of test/system and threat tested. Targeted investment initiated in FY 2006 is coming to fruition, with a number of improved T&E capabilities delivered or in progress during 2009.

The primary capability for non-medical CBDP testing is located at DPG, West Desert Testing Center. The CBDP operates and sustains DPG as part of the nation's Major Range and Test Facility Base to provide the specialized T&E facilities required for surety and simulant testing. DPG provides acquisition system developmental testing and supports operational testing by all Services. The CBDP has met the requirements of the *FY 2003 National Defense Authorization Act* to fully sustain DPG's O&S, moving from 33 percent funded to 100 percent funded. This allows acquisition programs to have an established test bed and to plan their test programs to fund only direct test costs.

From the desk of the CBRN Defense T&E Executive: The development and fielding of CBRN defense equipment requires highly specialized and robust T&E infrastructure including facilities, methodologies, and personnel resources as we respond to the development of new technologies and emerging threats. Additionally, the restricted nature of field testing with simulants is driving a renewed emphasis in M&S to provide data on environments and conditions not available for field testing.

The CBRN Defense T&E Executive published the FY 2010 - 2015 *T&E Infrastructure Investment Strategy (TIIS)* in FY 2008 as the path forward for defining and fulfilling future T&E infrastructure needs. This strategy is currently being updated to reflect investment needs for the FY 2012 - 2017 planning period. These efforts are aligned with the S&T development and acquisition programs they support. The need for continuing incremental T&E improvements is driven by the need for continuing improvement of threat realism in testing, refined test conditions and challenge materials, test robustness, M&S, and the ability to address continually evolving threats.

T&E capability and methodology development projects are planned and executed in multi-year increments, and successful implementation is directly dependent upon the funding levels in each year. New T&E infrastructure requirements for FY 2016 - 2017 are currently being identified. Continued investment in T&E infrastructure is driven by advancing technologies and emerging threats that require additional test capabilities and revalidation for refined test conditions.

The TIIS focuses on acquiring T&E infrastructure capabilities to remedy remaining T&E capabilities gaps and further improve operational realism of testing for a greater range of BWAs/CWAs. Simulant development, a key area of the S&T effort, includes developing families of simulants that can be used to predict system agent performance and that operators can use safely in outdoor environments. Mobile, deployable test capabilities are also needed to perform field simulant testing in multiple natural environments to ensure that CBRN defense systems are effective, suitable, and survivable across the range of environments. These capabilities will enable testers to provide combat developers with specific information regarding how to properly use CBRN defense systems to mitigate risks in the CBRN environment and provide system developers with the information required to adequately develop and mature the systems.

The following capability improvements are expected to be delivered in FY 2010 by JPEO-CBD/JPM-NBC CA:

- *Dynamic Test Chamber (DTC)*: Provides capability and control of real-world chemical point detection testing in various environments and challenge concentrations to test CWA point detectors. Capability is expected to be available in the second Quarter.
- *Man-in-Simulant Test (MIST) Chamber Upgrades, Real-time Sensor*: Monitors the breakthrough of a simulant through IPE material in real-time and is expected to be available in the fourth Quarter. It should be noted that the DPG MIST facility is currently non-functional and requires rebuild due to an accidental electrical fire in the control room during 2008. No personnel were injured.
- *Baker Lab Upgrade*: Provides laboratory space to support the Whole System Live Agent Testing (WSLAT) full system chamber.
- *ColPro Facility Upgrades*: The chemical agent simulant and toxic vapor filtration tests upgrade existing small air purification test fixtures to improve reliability, performance, and monitoring. The long-term CBR Filtration Evaluation Facility is capable of evaluating the efficacy of filtration technologies over extended periods of operation.

INITIATIVES

- The CBRN Defense T&E Executive is leading efforts to establish T&E standards for the full range of CBDP systems testing. Established general T&E standards serve as guidance for the quality, documentation, and rigor required for each test capability and associated test procedures. The goal is to provide validated, repeatable, and reproducible test procedures, and to maximize commonality and sharing of data with both interagency and international partners. The end result of this effort will be increased value and utility of test data with reduced cost through the reduction of repeat test events, test error, and duplicative efforts, and the production of validated data for use with modeling and model development.

  The CBRN Defense T&E Executive is working community-wide to leverage JSTO-CBD and JPEO-CBD test technology and capability developments and ensure expert review, validation, and full utility of the fielded test capabilities and to guide development of T&E standards. These efforts include the T&E Capabilities and Methodologies Integrated Process Team (TECMIPT), which defines requirements for T&E capabilities and provides opportunities for participation by all stakeholders in T&E standards development for each system type. The TECMIPT ensures completeness and quality of the T&E standards packages for approval by the CBRN Defense T&E Executive and publishing and unrestricted use.

  Coordination of the T&E standards development effort includes the DHS, U.S. Environmental Protection Agency (EPA), and the member countries of the AUS/CAN/UK/US CBR MOU; as well as all Military Departments, the DoD, and industry as appropriate. The CBRN Defense T&E Executive is also supporting the White House National S&T Council Subcommittee on Standards Roadmap Working Group in incorporating DoD CBDP T&E Standards into the National strategy on standards. International efforts are already ongoing in the AUS/CAN/UK/US Test, Evaluation, and Simulation Working Group (TESWG) to build on existing CBDP Test Operations Procedures (TOP) and emerging T&E standards to develop Multi-National TOPs.

  A T&E Standards Development Plan describing the processes for developing T&E standards is in final coordination and is expected to be published in February 2010.

- In order to prepare more effectively for emerging threats, Headquarters, Air Force Strategic Plans and Policy is revisiting the topic of KPPs for Counter-CBRN (C-CBRN) technologies. The objective of this task is to assign threshold metrics for C-CBRN equipment (i.e., detection, protection, decontamination, etc.) to evaluate system performance against various challenge levels. Ultimately, KPPs can inform the design of tests to address performance gaps in C-CBRN equipment.
- In 2004, Air Mobility Command (AMC) began the process of obtaining funding for an experiment to determine a “reasonable” crew duty period while flying in IPE. In 2008, the JRO-CBRND released funding for the initiative. This Joint experiment involves testing Mobility Air Forces using C-130s and C-17s, Navy and Marine Corps helicopters, and possibly fighters from Air Combat Command. Three groups of C-130 aircrew members donned aircrew CB suits for eight-hour tactical Night Vision Goggle (NVG), low-level Exchange Zone (EZ) missions during the Joint Aircrew Duration in Protective Ensemble experiment held at Little Rock AFB, AR, from March 24 through April 3, 2009. AMC is trying to determine the optimal distance for the EZ location in relation to the contaminated base, as aircrew must be in IPE while flying contaminated aircraft. Current Air Force and AMC regulations do not specify any limitations on aircrew duty periods while in IPE. Depending on the aircraft and mission, current crew days can run from 12 to 24 hours for augmented crews.

ACCOMPLISHMENTS

- Published CBDP T&E Standards that provide guidance to the CBDP T&E community concerning basic standards for testing to ensure consistency and repeatability of test results. Implemented new methodology for developing T&E capability requirements.
- Actual development and acquisition of the following T&E capabilities was accomplished by JPEO-CBD/JPM-NBC CA during FY 2009:
  - Completed Dynamic Entry/Exit Test Module and Instrument Upgrade at Eglin AFB, FL: Upgrades test module and laboratory analytical equipment to support static and dynamic testing of ColPro systems.
  - Completed installation of mechanical filtration upgrade: Upgrades large scale simulant gas life test fixture and particle test fixture to improve reliability and performance; supports simulant breakthrough and particulate efficiency testing of large air purification devices.
  - Completed Advanced Air Purification Upgrade: Provides test fixture for evaluating Advance Air Purification devices against chemical agent challenges and is able to test and evaluate full-scale air purification systems against chemical agents over a range of environmental conditions.
  - Completed Decon Facility Upgrades: Installed test fixture for decontamination efficacy testing of full-scale decontamination systems on small items (such as NVG and phones).
  - Conducted IPE Grid Study: Provides a standardized method for assigning common locations to the body and IPE to be used throughout the testing process.
  - Completed WSLAT Strung Out System and Methodology: Provides a strung out chamber (component), methodology, and M&S for testing biological point detection systems.
  - Completed Standard Unit of Measure Study: Proposes a single unit of measure for biological aerosols and biological material in liquid independent of material state and agent type to improve analysis of biological detection performance.
  - Integrated Bio-Spectral Instrument into test lab: Provides a spectral characterization instrument to measure spectral signatures and cross sections of BWAs and simulants.

INNOVATIONS

- The Test Grid project will fully instrument DPG's target R, target S, and tower grid for CB simulant field testing to include modern, accurate, and reliable referee instrumentation; NRT data analysis and visualization tools; a data management system; a command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) network; and a safari (mobile) capability. Component test planning and testing are ongoing. Improvements in existing test grid systems resulting from development of this project have already been realized and have supported FY 2009 test events including the CBDEWS demonstration. Initial capability is expected to be available in the fourth quarter of FY 2010.
- The fully articulated mannequin capability will provide robust testing of protective ensembles in a CWA surety chamber environment. It is robotic in nature and will closely emulate human movement in various task-oriented scenarios. Design development is expected to be complete and build initiated in late FY 2010.

Unmanned Aerial System demonstrated as part of the CBDEWS ATD conducted at DPG.

Assessment

T&E is assessed as green/yellow. T&E infrastructure is improving based on investments made in FY 2006 through 2009. Funds are programmed to continue upgrading T&E infrastructure that is aligned with national priorities to support acquisition program testing needs.

Sense – Chemical Detection System T&E Infrastructure
Current capabilities for chemical stand-off detector testing are limited to a stand-off CWA chamber (simulant only) and field simulant capability for CWA stand-off detection performance tests. Current CWA point detection performance test chambers (agent) can provide common static challenge concentration profiles with a small range of environmental conditions and interferents. Efforts to improve this area include a NTA test facility, a DTC, and equipping of the renovated Chemical Surety Laboratory. The NTA facility provides a capability to conduct emerging, highly toxic threat materials testing. The DTC provides a new capability for testing chemical point detection systems against chemical agents in various environmental conditions and with dynamic and high sensitivity challenge conditions.

Sense – Biological Detection System T&E Infrastructure
Current capabilities for biological detector testing comprise subsystem level tests of point detection systems at biosafety level three for BWAs, as well as system chamber and field tests using simulants. Efforts to improve the biological detection testing infrastructure include a WSLAT chamber and planning requirements for biological stand-off detection T&E capabilities. The WSLAT chamber will support the testing of all biological point detection systems in production configuration in BWA environments.

Sense – Field Simulant T&E Infrastructure
Current capabilities for field simulant testing comprise traditional referee instrumentation and simulant challenge dissemination devices. Efforts to improve in this area include a fully instrumented 1km^2 resolution fixed test grid and three 5km^2 medium resolution relocatable test grids that integrate cloud tracking equipment, meteorological equipment, test data network, C4ISR networks, and an operations center. This T&E capability will accommodate both CB vapor and aerosol simulants. Additional efforts include instrumentation and characterization of the existing Joint Ambient Breeze Tunnel (JABT) and Active Stand-off Chamber (ASC) facilities. The JABT/ASC effort will provide facilities for controlled CB simulant cloud and stand-off detector testing. Test Grid improvements will be fielded incrementally over FY 2011 - 2015 and will enable mission-based operational testing of BWA and CWA detection platforms and network systems.

Cloud characterization studies conducted at DPG using the JABT, the largest facility of its kind in the United States.

Shape – M&S T&E Infrastructure
Current M&S test capabilities do not exist for many acquisition programs. Efforts to improve this area include the development of a synthetic test environment library of real-world environmental and interferent physical characteristics that impact CB system performance. The environmental signatures will be integrated into models to generate synthetic environments to allow material performance assessment under various conditions. A key focus of S&T T&E supporting efforts is to develop models to predict system performance using material and component T&E data for each commodity area.

In summary, T&E infrastructure is improving with key CB defense T&E capabilities delivered in FY 2008 and those coming online in FY 2009. The T&E Executive published the TIIS, which provided the basis for a fully integrated and coordinated T&E plan consistent with the TRMC Strategic Plan. This effort will ensure that the CBDP keeps its T&E infrastructure up to date and aligned with national priorities to support POR testing needs. The T&E community is fully engaged with the acquisition, S&T, and requirements communities to plan and acquire T&E capabilities with rigorous standards and validation to ensure that the highest performing systems are delivered to all of our Warfighters for tactical operations, Homeland Defense, consequence management, and Installation Force Protection.

Shield/Sustain – IP, ColPro, and Decontamination T&E Infrastructure
Current test capabilities comprise chemical agent material swatch tests, which allow for comparative performance assessment under limited conditions and test environments, a vapor and aerosol MIST, an IPE Grid, a simulant agent resistant test mannequin, a torso to test CB masks, and protection factor mask tests. At present, the MIST capability is out of commission due to a fire in the control center; however, a commercial source is being used in the interim.

Efforts to improve in this area will include a decontamination system CWA test chamber, an IPE Mannequin System, MIST instrumentation, CB agent resistance test (CBART) equipment, and ColPro simulant instrumentation/chamber. The decontamination test chamber will provide an enhanced ability to conduct decontamination and residual agent off-gas testing. The IPE Mannequin System will provide an articulated robotic mannequin that simulates Warfighter activities for evaluating IPE performance against CWA challenges. The MIST instrumentation will provide a NRT simulant sensor system to monitor penetration of simulant vapor and aerosols during testing. The IPE Grid will provide test procedures to establish commonality measurements for IPE system-level performance tests. The CBART will provide improved test fixtures and a NRT testing capability under a range of environmental conditions for IP and ColPro materials from which data can be used to more accurately assess toxicological exposure levels. ColPro instrumentation upgrades will provide improved test capabilities for the evaluation of entire ColPro systems, subsystems, and individual components. The improved MIST, new mannequin, and CBART are expected in FY 2012 as fielded test capabilities.

Doctrine, Training, Leadership, and Education

The CBDP has developed doctrine and built robust training, leadership, and education programs based on the belief that no one should perform a task in a real-world operation without having previously performed a similar task in training or through education.

CBRN training and education focuses on the needs of three customers: the Military Departments, Combatant Commands, and other DoD agencies. The Military Departments have Title 10 responsibility to train and equip the forces to carry out their respective missions. The Combatant Commands ensure the availability of needed capabilities for unified action. Department agencies ensure unified action and that the Warfighter is fully supported.

House of Representatives Report 109-452

The House Armed Services Committee Report, H.R. 5122, requested the OATSD(NCB/CB) to review and perform a gap analysis on NBC defense Joint training, certification, and doctrine alignment:

> *"... in coordination with the Secretary of the Army, Secretary of the Navy, and Secretary of the Air Force, to perform a gap analysis on NBC defense training, to review NBC defense doctrine across each of the military services, and to make recommendations to the Secretary of Defense, the Senate Committee on Armed Services and the House Committee on Armed Services by October 1, 2007, regarding the implementation of joint training, certification, and doctrinal alignment for NBC defense for both the active and reserve components."*

The Department submitted its report, *Joint Training and Certification for NBC Defense*, to the House Armed Services Committee in October 2007 in response to the House Armed Services Committee report language. This report identified potential education and training gaps in NBC defense that inhibits the U.S. Armed Forces' mission in the face of a NBC threat.

The Department is analyzing these potential gaps and shortfalls through the CWMD Passive Defense CBA. This CBA is still in draft; once vetted, the Military Departments will develop plans to mitigate or resolve those gaps and shortfalls through the submission of recommendations.

The Department will continue to report progress, describing steps taken and planned steps to improve CBRN defense DTL&E in future editions of the CBDP ARC.

Department of Defense Chemical, Biological, Radiological, and Nuclear Defense Doctrine, Training, Leadership, and Education Strategic Plan

Significant progress has been made in the development of the DoD CBRN Defense DTL&E Strategic Plan (dated December 5, 2008) and the DoD CBRN Defense DTL&E Implementation Plan with Oversight Matrix (dated May 8, 2009).

The DTL&E strategic goal is to continue developing and integrating adaptive and innovative Joint CBRN defense capabilities and enable the Department to operate readily with interagency and multi-national partners in support of the National Military Strategies.

The successful implementation of the DoD CBRN Defense DTL&E Strategic Plan objectives will ensure that a training system is in place to provide an integrated and adaptive Joint Force able to survive and operate successfully in CBRN environments with a full understanding of the CBRN survivability of their equipment. The DoD CBRN Defense DTL&E Implementation Plan specifies actions to implement the DTL&E Strategic Plan's objectives and capabilities, defines responsibilities, and provides the procedures to oversee DoD CBRN defense DTL&E activities. It sets the conditions for continued development and integration of an adaptive and innovative Joint CBRN defense capability. This enables the Department to operate with interagency and multi-national partners in support of the National Military Strategies.

The DTL&E Oversight Matrix identifies the specific actions associated with addressing the CBRN defense DTL&E goal, objectives, and capabilities; identifies the Office of Primary Responsibility/Office of Collateral Responsibility for the development of a baseline assessment for each action and the source of the assignment of responsibility; and documents milestones and program status updates.

The Department will achieve its CBRN defense DTL&E goal and objectives through continuous facilitation, coordination, and synchronization of existing oversight processes, which includes assessing feedback, analyzing processes to monitor results, and identifying areas requiring additional emphasis. Execution of the four strategic objectives will follow these established processes: evaluate the status of the force; identify and validate gaps and shortfalls; advocate changes and improvements to resolve gaps and shortfalls; and monitor changes to facilitate continuous improvements. The four strategic objectives and their supporting capabilities are shown in the table on the following page. The following section will present Military Departments accomplishments, initiatives, and innovations framed around each objective.

The ATSD(NCB/CB), Joint Staff, and the Military Departments are conducting baseline assessment of the actions supporting the Strategic Plan Objectives and establishing metrics to measure progress.

Department of Defense Chemical, Biological, Radiological, and Nuclear Defense Doctrine, Training, Leadership, and Education Strategic Plan Objectives, Capabilities, and Actions

DoD CBRN Defense Doctrine, Training, Leadership, and Education Strategic Plan Objectives, Capabilities, and Actions:
The Objectives, Capabilities, and Actions from the DoD CBRN Defense Implementation Plan are listed below to simplify development of input.

A. OBJECTIVE: Improved, Integrated, and Unified CBRN Defense Operations			
	1. CAPABILITY: Improved CBRN defense preparedness	**2. CAPABILITY: CBRN defense unity of effort across Military Departments and DoD agencies**	**3. CAPABILITY: Improved individual and organizational CBRN defense competency**
ACTIONS	• Improve realism of CBRN training and exercises • Expand Joint, multi-national, and interagency training • Expand opportunities for multi-Service training programs • Increase Joint training opportunities • Identify opportunities for accreditation that enhance interoperability • Incorporate mission essential equipment CBRN contamination survivability and hardness as a CBRN defense shaping factor under DTL&E	• Expand training for disaster response and consequence management • Expand education, training, and experimentation initiatives • Share training, planning, and other appropriate resources • Expand training for the combating WMD missions per the *NMSCWMD* (e.g., Security Cooperation and Partner Activities, Threat Reduction Cooperation, Interdiction Operations, WMD Consequence Management, Active Defense, Passive Defense, Offensive Operations, and Elimination Operations)	• Expand CBRN leader training and education programs • Incorporate lessons learned from the operational environment • Improve realistic individual and collective skills training • Expand distance learning, computer simulation, and virtual reality training • Enhance Professional Military Education (PME) curricula, associated wargames, and workshops opportunities
B. OBJECTIVE: Sustained Adaptive and Innovative Environment			
	1. CAPABILITY: Mindset and culture that encourages individuals and organizations to adapt and innovate in CBRN environments	**2. CAPABILITY: Enhanced effectiveness with our interagency and multi-national partners**	
ACTIONS	• Rapidly and consistently update CBRN defense doctrine and operational concepts • Shape professional education and collective training to encourage adaptive and innovative thinking • Incorporate principles and effects of sustained CBRN operations in training, exercises, PME, and leader development programs	• Prepare DTL&E products and execute training strategies that further enhance effective Joint, combined, interagency, and coalition operations • Integrate with interagency and multi-national partners • Develop and share resources with interagency and multi-national partners	
C. OBJECTIVE: Aligned CBRN Defensive Training Infrastructure			
	1. CAPABILITY: Continued CBRN defense DTL&E capability investment	**2. CAPABILITY: Improved multi-Service and Joint CBRN defense education and training infrastructure**	
ACTIONS	• Continue modernization and construction of facilities and training areas • Ensure ability to train with interagency and multi-national partners	• Develop policies to enhance multi-Service and Joint CBRN defense training infrastructure • Expand homeland defense education, exercises, training, and experimentation initiatives • Examine and validate combinations of materiel and non-materiel capabilities through the JCIDS process • Validate appropriate CBRN experimentation solutions	
D. OBJECTIVE: Established Performance-Based Management Process			
	1. CAPABILITY: Policies enable DoD CBRN defense DTL&E goals	**2. CAPABILITY: Linked DoD CBRN Defense DTL&E Strategy to budget and resource actions**	**3. CAPABILITY: Measure the effect of CBRN defense initiatives on DoD forces**
ACTIONS	• Align authorities, policies, and practices to enhance CBRN defense opportunities for the force • Establish policies that encourage and enable creative solutions to unforeseen issues • Establish policies to empower decentralized execution with our international and interagency partners	• Align Joint training and education capabilities and resources with Combatant Commander's operational needs • Link needs to budget and resource actions through the PPBE process • Align Joint training and education capabilities and resources with Combatant Commander's operational needs • Link needs to budget and resource actions through the PPBE process	• Validate gaps and shortfalls • Prioritize deficiencies and recommend a course of action for resolution and assignment of responsibility • Implement the Preparedness Assessment Methodology and assess preparedness against the *NMSCWMD*

The desired capabilities are to improve CBRN defense preparedness, develop CBRN defense unity of effort across Military Departments and Defense Agencies, and improve individual and organizational CBRN defense competency. Provided are the significant accomplishments of the Joint Staff and Military Departments to obtain this objective.

Service Activities for the Doctrine, Training, Leadership, and Education Objectives

Objective A: Improved, Integrated, and Unified Chemical, Biological, Radiological, and Nuclear Defense Operations

Joint Staff

The Joint Staff coordinated Foreign Consequence Management planning with the Interagency through the Weapons of Mass Destruction – Terrorism – Foreign Consequence Management Working Group with the State Department. This effort continues with the intent of coordinating training events to exercise the capability of partner nations and the U.S. Armed Forces. Additionally, the JRO-CBRND conducts the joint CWMD Familiarization Course (JCWMDFC) to multiple combatant commands. The JCWMDFC is designed to provide Joint Staff Officers and Component/Service Officers an appreciation of CBRN weapons and effects, strategic WMD threats, and associated planning considerations.

The DoD published DoDD S-2060.04, *DoD Support to the National Technical Nuclear Forensics (NTNF) Program*, dated April 1, 2009. This directive establishes policies and assigns responsibilities for supporting the NTNF program. The guidance assigns Air Force responsibility to field the objective DoD NTNF capability, including providing acquisition management in accordance with the JCIDS process and DoDI 5000.02 (December 8, 2008) and ensuring that DoD NTNF operational response assets are manned, trained, equipped, and sustained.

In FY 2009, the JRO-CBRND provided exercise support to the U.S. European Command (USEUCOM), U.S. Pacific Command (USPACOM), U.S. Northern Command (USNORTHCOM), U.S. Southern Command (USSOUTHCOM), U.S. Special Operations Command (USSOCOM), USSTRATCOM, U.S. Army North (ARNORTH), Joint Task Force-Civil Support (JTF-CS), Joint Task Force-Elimination (JTF-E), Joint Elimination Coordination Element (JECE), SCC-WMD, and DTRA in the following exercises:

- USNORTHCOM/JTF-CS VIGILANT SHIELD 09
- JTF-CS SUDDEN RESPONSE 09
- SCC-WMD GLOBAL LIGHTNING 09
- JTF-E KEY RESOLVE 09
- USNORTHCOM/DTRA ARDENT SENTRY 09
- USSTRATCOM/SCC-WMD GLOBAL THUNDER 09
- USSOCOM CBRN TTX 09
- USPACOM/JECE TALISMAN SABER 09
- USNORTHCOM/ARNORTH VIBRANT RESPONSE 09
- USSOUTHCOM PANAMAX 09
- USEUCOM FLEXIBLE RESPONSE 10.

Army

Army CBRN defense training and education continues to evolve in response to changing world threats. The Army supported Combatant Command-critical Joint Chiefs of Staff training requirements through the conduct of CJCS and Army exercises. These exercises, including: VIGILANT SHIELD, ARDENT SENTRY, EMPIRE, and VIBRANT RESPONSE, validated and improved the CBRN defense capability within the Army. The U.S. Army Chemical Biological Radiological Nuclear School (USACBRNS), Fort Leonard Wood, MO, has updated and modified all institutional courses to support full spectrum CBRN defense operations. In addition, the USACBRNS continues to provide institutional training to military consequence management response assets, such as the NGB WMD CSTs, CBRNE Enhanced Response Force Package, USNORTHCOM's CBRNE Consequence Management Response Force, and the Coast Guard's National Strike Teams.

The USACBRNS continues to optimize internal and external expertise and available resources to maximize the Army's and the Services' ability to train and educate the full spectrum of CBRN defense operations. During 2009, the USACBRNS completed the move of the Technical Escort Course from Redstone Arsenal, AL to Fort Leonard Wood, MO and developed the Dismounted Reconnaissance Course in support of Army and other Service operations in Iraq, Afghanistan, and domestic consequence management. In addition, working with the JPEO-CBD, Headquarters, Department of the Army, and ECBC, the USACBRNS developed advanced incident manager and biological surety manager courses.

The USAMANSCEN and the USACBRNS, in conjunction with the Department of the Army, perform lead Service functions for the development of tactical level multi-Service doctrine and associated TTPs related to the CBDP. During FY 2009, the Army continued to develop and maintain its Service-specific doctrine and TTPs to include updating doctrine included in interim CBRNE Operational Headquarters, as well as Homeland Security operational support from WMD CSTs publications. These two publications illustrate the U.S. Army's flexible process to keep current, relevant, and useful in a dynamic global environment. Other U.S. Army doctrine development efforts include integration with and support to international agreements and related joint and multi-Service doctrine.

Navy

The Navy views CBRN threats as a component of the operational environment, not as a unique mission. During 2009, the Navy continued updating *Naval Ships' Technical Manual (NSTM) 070,* the primary shipboard reference for nuclear and radiological defensive measures. The Navy also commenced updating *Naval Ships' Technical Manual 470,* its primary shipboard reference for CB defensive measures. The Navy continues to develop TTPs and acquisition requirements for conducting at-sea maritime interception operations for situations when the threat or the presence of CBRN weapons or components exists. As these experimental TTPs are approved, incorporation will take place into appropriate doctrine, such as Navy TTP 3-07.11, *Maritime Interception Operations*. Navy Doctrine updates include the NSTM Chapter 470 and the MCU-2 series Tech Manual.

The Readiness Assistance Visit team completed 74 official visits and provided CBR support, system repair work, and training to more than 70 additional ships and various fleet units using Distance Support, the Naval Sea Systems Command (NAVSEA) CBR information Website, and the team's waterfront presence in San Diego, CA and Norfolk, VA.

Air Force

Significant structural changes were made to the FY 2010 - 2011 Roadmaps to further improve the Air Force's C-CBRN capabilities across all of the Air Force doctrinal pillars: proliferation prevention, counterforce, active defense, passive defense, and consequence management. Education, Training, and Exercises are addressed in a separate section, as the initiative cuts across all five pillars.

The Air Force is working to implement the Air Force Incident Management System (AFIMS) fully by December 2009. AFIMS aligns the Air Force with DoD guidance, the civil sector's NIMS, and the National Response Framework.

In order to resolve existing shortfalls with regards to lack of CBRN-related operational standards, the Air Force drafted measurable standards across the threat spectrum for unit and installation-level CBRN mission sustainment activities. Each standard was developed using profiles from the 31 critical missions considered during the development of the Counter-Radiological Warfare (C-RW) CONOPS. This allowed each standard to be based upon an analytical justification. Representative CBRN scenarios, based on existing/approved scenarios (e.g., national planning scenarios), peacetime, and wartime scenarios for CBRN materials and TICs were analyzed with respect to the draft standards. Overall, a cumulative total of 13 generic, 65 functional specific, and four installation standards were developed in 2009.

Ongoing doctrine development efforts include Air Force Tactics, Techniques, and Procedures (I) 3-2.71, *Multi-Service Tactics, Techniques, and Procedures (MTTP) for Weapons of Mass Destruction Elimination Operations*, which supports multi-Service efforts to support WMD-Elimination (WMD-E) operations as described in Appendix A, JP 3-40, *Combating WMD*, dated June 10, 2009. The MTTP is expected to be published in FY 2010.

Marine Corps

Emerging WMD threats, including TIMs and radiological dispersal devices, have required the Marine Corps to adopt new TTPs to reduce these hazards through creation of the Marine Air Ground Task Force (MAGTF) CBRN Assessment and Consequence Management (ACM) set. The Marine Corps is finalizing the incorporation of these sets into the operating forces. New MAGTF ACM TTPs are being included into the formal period of instruction at the CBRN Defense School. The sets will provide the MAGTF Commander with the capability to conduct robust CBRN reconnaissance and surveillance missions, as well as sensitive site assessment in CBRN conventional warfare agent and TIM environments.

The Marine Corps executed a series of war games to refine and update the MAGTF CBRN Defense Operating Concept. The objectives were to identify required capabilities and DOTMLPF implications of the concept and determine implementation actions. This series of war games fully validated the concept and supported the refinement and development of follow-on concepts and acquisition strategies.

Ongoing doctrine development efforts include: revision of Marine Corps Warfighting Publication (MCWP) 3-37, MAGTF CBRN Operations, to reflect TTPs for the MAGTF CBRN ACM Set; MCWP 3-37.6, *Recovery Operations in a CBRN Environment*, intended for use by commanders and staff performing recovery operations in a CBRN environment; and MCWP 3-37.7, *MTTP for WMD-E Operations*, which addresses Multi-Service roles and responsibilities in supporting WMD-E.

During FY 2009, the Marine Corps released two publications and a change publication:

- MCWP 3-37.1 provides commanders and staffs a key reference for the planning and execution of Service CBRN operations, with focus on supporting C-WMD operations at the tactical level.
- MCRP 3-37B incorporates the characteristics of the CBRN shape capability area as addressed in Joint concepts and doctrine, and provides TTPs for managing CBRN threats and hazards in the larger context of multi-Service military operations.
- MCRP 3-37.2A, Ch.1 incorporates revised CBRN hazard prediction modeling information.

Objective B: Sustained Adaptive and Innovative Environment

The desired capabilities are to improve the mindset and culture that encourages individuals and organizations to adapt and innovate in CBRN environments and enhance effectiveness with our interagency and multi-national partners. This objective will address the following actions at the conclusion of the Joint Staff's CWMD Passive Defense CBA in the third quarter of FY 2010:

1. Rapidly and consistently update CBRN defense doctrine and operational concepts.
2. Shape professional education and collective training to encourage adaptive and innovative thinking.
3. Incorporate principles and effects of sustained CBRN operations in training, exercises, PME, and leader development programs.
4. Prepare DTL&E products and execute training strategies that further enhance effective Joint, combined, interagency, and coalition operations.
5. Integrate with interagency and multi-national partners.
6. Develop and share resources with interagency and/or multi-national partners.

The U.S. Army continues its transformation to modular operations, to include doctrine associated with force employment. During 2009, the USAMANSCEN doctrine team continuously assessed modular force modernization and integrated CBRN capabilities into the corresponding doctrine to ensure that Warfighter support is current, relevant, and consistent with the transformation process.

The desired capabilities are to continue CBRN defense DTL&E capability investment and improve multi-Service and Joint CBRN defense education and training infrastructure. Provided are the significant accomplishments of the Joint Staff and Military Departments to obtain the objectives.

Joint Professional Military Education (JPME) is a CJCS approved body of objectives, outcomes, policies, procedures, and standards supporting the educational requirements for Joint Officer Management. JPME is delivered through a three-phased approach to joint education by Service intermediate and senior level colleges, the Joint Forces Staff College, and the National Defense University.

In FY 2009, Joint Publication (JP) 3-40, *Combating Weapons of Mass Destruction,* was updated and work began to revise JP 3-41, *Chemical, Biological, Radiological, and Nuclear Consequence Management*. These publications, along with JP 3-11, revised in FY 2008, form the doctrinal foundation for the joint force commander and staff in the planning and execution of CBRN defense operations. The Department signed one multi-Service manual, three Service manuals, and two NATO documents. In addition to JP 3-41, there are also 14 multi-Service and Service manuals and two NATO documents currently under revision. A complete listing of relevant allied, Joint, and multi-Service CBRN defense doctrine is available on the OATSD(NCB/CB) website: http://www.acq.osd.mil/cp/ch6_doctrine.table-090911.doc

JPME Learning Areas and Objectives associated with CBRN defense/CWMD were reviewed and updated through the CJCSI 1800.01 revision.

PME curricula, associated war games, and workshops will provide increased opportunities for training on CBRN defense with the purpose of addressing the CBRN threat and U.S. response capability. All Department personnel must understand the CBRN threat, be familiar with U.S. capabilities, and comprehend their roles and responsibilities in handling CBRN defense issues. The incorporation of CWMD learning areas in the CJCSI 1800.01D, *Officer PME Policy*, as well as CJCSI 1805.01, *Enlisted PME Policy*, shows the increasing priority of this area.

The JRO-CBRND provided CBRN SME support to intermediate and senior college curricula and war games; Joint Land, Aerospace, and Sea Simulation; Strategic Decision Making Exercise; Solo Challenge Exercise; National Response to Catastrophic and Disruptive Threats Exercise; and Joint Advanced Warfighting Exercise.

Subsequent submissions of the CBDP ARC will update information regarding the progress of this objective.

Objective C: Aligned Chemical, Biological, Radiological, and Nuclear Defensive Training Infrastructure

Joint Staff

An integrated training and education approach develops leaders from all ranks capable of responding to the entire range of CBRN threats and effects to protect our nation, operating seamlessly with military and civilian partners. Training enables Joint, Service, multi-national, and interagency forces to operate in CBRN environments, and therefore improves adaptability, agility, and relevance in both conventional and irregular warfare. CBRN defense readiness training programs include realistic individual and collective skills training and maximize the use of emerging technologies, including distance learning, computer simulation, and virtual reality. Training, exercises, and leader development programs incorporate the principles for operations in CBRN environments and include realistic consideration of CBRN weapons effects on sustained operations.

USSTRATCOM hosted the Global Synchronization Conference (GSC-2) for the CWMD Community of Interest in July 2009. GSC 10-1 occurred in January 2010 and will continue synchronization of CWMD efforts across the Department.

Several bi-lateral initiatives including the Czech Republic, Singapore, the Republic of Korea, and Japan occurred in FY 2009. The Japanese event held at Yokota AFB focused on A/C decontamination, contaminated remains handling, and biological surveillance.

The Joint Staff continues to enhance its active role in the integration of CWMD into intermediate and senior-level PME institutions. Current initiatives by the Joint Staff support the Service and Joint PME system by providing alternatives on how to best integrate CWMD/CBRN defense. Success has been achieved through a review of curriculum and war game scenarios, SME support to war games and as guest speakers for CWMD electives, and developing course curricula and other related support.

U.S. Soldiers and Airmen with the Georgia National Guard's Joint Task Force 781 CBRNE Response Force process casualties through a decontamination line during exercise SUDDEN RESPONSE 09 at Camp Blanding, FL. (U.S. Army photo by Staff Sgt. Ave I. Pele-Sizelove)

Personnel assigned to the Naval Station Pearl Harbor review a map of the affected area during a CBRNE exercise on historic Ford Island, HI. (U.S. Navy photo by Mass Communication Specialist 3rd Class Robert Stirrup)

Army

The Army's policy is to train all Soldiers on individual CBRN defense tasks to ensure their survival and mission continuation under any tactical condition. CBRN defense training is integrated into basic combat training and all phases of professional development.

The USAMANSCEN and USACBRNS serve as the Army's Center of Excellence for Soldier, CBRN Specialist, and Officer training and the associated development of Army CBRN training and education standards. The USACBRNS is also actively involved in finding opportunities for multi-Service CBRN training, advanced education, and collaboration with noted national research centers such the ECBC and DPG. In addition, the USACBRNS continues its formal relationship with the Air Force and Air Force Civil Engineer Support Agency (AFCESA), training and providing DoD Hazardous Material (HAZMAT) certifications to more than 7,180 personnel from all Services.

The USACBRNS, working with Service CBRN Schools located at Fort Leonard Wood, MO, has initiated a planning and feasibility study for the construction of a Joint CBRN Training Facility, designed to support unique Service CBRN training and education requirements fully. This facility will be designed to meet congressional intent as outlined in Title 50, chapter 32, section 1522 U.S.C. to "consolidate all chemical and biological warfare defense training activities of the Department of Defense" while maintaining Service-unique CBRN training requirements and Title 10 responsibilities.

Staff Sgt. Corey Jones reviews his checklist during the PENINSULA-WIDE COMBAT EMPLOYMENT RESPONSE EXERCISE July 26 at Kunsan Air Base, Republic of Korea. (U.S. Air Force photo by Senior Airman Steven R. Doty)

Navy

The Navy Shore Force Training Center initiated the Installation Emergency Manager Course, training Installation Emergency Management Officers on all-hazards preparedness, mitigation, response, and recovery, including CBRN hazards. Six Navy installations completed a CBRN field training exercise with newly provided equipment from the JPM-Guardian Installation Protection Program.

The U.S. Fleet Forces Command completed Exercise SOLID CURTAIN/CITADEL SHIELD '09 (SC/CS-09) on February 27, 2009. The four-day drill was the DoD's largest stateside Anti-Terrorism/Force Protection exercise and concluded with 181 simulated events conducted by Navy shore installations and activities within the continental United States. CBRN defense simulated events were included. SC/CS-09, designed to enhance Naval Security Force personnel training and readiness in response to installation and unit threats, used multiple command and security force processes that would normally be implemented in the event of an actual emergency.

As an adjunct to the Readiness Improvement Program effort, the NAVSEA established a Waterfront CBRN Support Team in Norfolk, VA and San Diego, CA to assist ships preparing to deploy overseas. Consisting of technical and operational experts, the teams are able to evaluate the status of the ship's CBRN equipment, assist in repairs and maintenance, and provide hands-on, individual training to Sailors. A total of 83 activities were assisted through the Waterfront CBRN Support Teams.

Air Force

Minot AFB, ND and Andrews AFB, MD hosted the C-RW CONOPS validation exercises. Exercise participants took part in training sessions and a TTX to validate the C-RW CONOPS and associated lesson plans, operational risk management tools, and decision aids. Based upon observations and participant feedback, the validation exercises were successful. The C-RW CONOPS will begin implementation in late 2009. Implementation will take place in two phases over the course of two years.

The AFCESA coordinated HAZMAT Technician level training of approximately 100 additional Emergency Management Airmen through the Army CBRNE Responder Technician Course at Fort Leonard Wood, MO.

The Air Force trained over 35,000 trainees in CBRN defense during basic military training.

Marine Corps

Awareness of CBRN Defense is incorporated into all unit and MOS Training and Readiness (T&R) Manuals, as well as all levels of training and operational planning in the Marine Corps. CBRN training is specifically addressed at the small unit level to maximize force protection and unit survivability. Additional CBRN training occurs in the Marine Expeditionary Unit pre-deployment training program and at the Marine Corps Air Ground Combat Center in Twenty-Nine Palms, CA.

Annually, Individual Survival Standards (ISS) training is conducted for all Marines using the standards of proficiency outlined in Marine Corps Order (MCO) 3400.3F, NBC Defense Training and the Marine Corps Common Skills Manuals. In conjunction with ISS training, all Marines complete an IPE confidence exercise once per calendar year. Units perform to the basic operating standards of proficiency and CBRN defense team operations when conducting missions under CBRN conditions.

Airman 1st Class Ryan Quiles, 51st Security Forces Squadron, surveys the scene for suspicious activity during exercise BEVERLY BULLDOG 08-03 peninsula wide operational readiness exercise. (U.S. Air Force photo by Staff Sgt. Scottie McCord)

The Marine Corps offers online computer-based training to assist all Marines with their proficiency and sustainment of ISS as well as correspondence courses to reinforce sustainment of unit CBRN reconnaissance and decontamination teams. The Guidebook for Marines, provided to each recruit during basic training and officer candidate at Officer Candidate School, also provides each Marine an awareness of CBRN ISS as they enter the Marine Corps. The newly implemented Marine Corps CBRN Defense enlisted career roadmap provides MOS guidance for professional development and training. CBRN training and education is in development to provide Marines at all levels and ranks further CBRN awareness for CBRN defense and supporting CWMD operations at formal schools.

Marines from the Battalion Landing Team 2/2, 26th Marine Expeditionary Unit don CBRN defense gear at a range in the Middle East on May 26, 2007. (Official USMC photo by Cpl. Jeremy Ross)

From 10 August to 24 September 2009, I MEF conducted its final FY 2009 MAGTF CBRN ACM course. The MAGTF CBRN ACM course consists of 25 training days in which students are certified in HAZMAT Awareness, HAZMAT Operations, and as HAZMAT Technicians. These certifications are accredited by the International Fire Service Accreditation Congress and in accordance with the National Fire Protection Association's professional qualification standards. The MAGTF CBRN ACM course is primarily for CBRN defense personnel. Students gain a high proficiency in detection, sampling, identification, mitigation, decontamination, employment of equipment, and scenario-based training. The course consists of classroom instruction, practical application and four field exercises.

Objective D: Established Performance-Based Management Process

The desired capabilities are to ensure policies are in place to enable DoD CBRN defense DTL&E goals, link the DTL&E Strategy to budget and resource actions, and establish a process to measure the effect of CBRN defense initiatives on DoD forces.

This objective will address the following actions at the conclusion of the Joint Staff's CWMD Passive Defense CBA in the third quarter of FY 2010:

1. Align authorities, policies, and practices to enhance CBRN defense opportunities for the force.
2. Establish policies that encourage and enable creative solutions to unforeseen issues.
3. Establish policies to empower decentralized execution with our international and interagency partners.
4. Align Joint training and education capabilities and resources with Combatant Commander's operational needs.
5. Link needs to budget and resource actions through the PPBE process.
6. Validate gaps and shortfalls.
7. Prioritize deficiencies and recommend a course of action for resolution and assignment of responsibility.
8. Implement the Preparedness Assessment Methodology and assess preparedness against the *NMSCWMD*.

Subsequent submissions of the CBDP ARC will update information regarding the progress of this objective.

(Left to right) Senior Airman Edward Connell, Staff Sgt. Adrian Sanders, Senior Airman Dusty Surber, and Master Sgt. Shayne Murphy take shelter in a hanger during a chemical exercise at Osan Air Base, Republic of Korea. (U.S. Air Force photo by Staff Sgt. Bradley C. Church)

Interagency and International Integration

The DoD CBDP coordinates its activities with OGAs and partner nations to ensure a fully integrated and robust CB defense capability. This coordination further encourages the exchange of knowledge, laboratory and test capabilities, and burden sharing within the interagency community while simultaneously identifying and eliminating redundant and duplicative efforts. Coordination efforts throughout the CBDP are crucial to providing an integrated approach of CBRN defense capabilities in support of the National Military Strategies.

Joint Interagency Efforts

The DoD CBDP's activities are coordinated with OGAs to obtain benefits from existing and ongoing programs initiated under the auspices of OGAs. The National Security Council Interagency Policy Committee for Proliferation, Counterproliferation, and Homeland Defense coordinates the management, development, and implementation of national security policies related to CB defense activities. Additionally, the CBDP currently provides formal coordination with organizations such as the DARPA, DHS, S&T Directorate, EPA, and DHHS. The CBDP also participates on numerous interagency groups and committees to include the following:

- Counterproliferation Program Review Committee (CPRC) – comprised of members from the DoD, Department of Energy (DOE), Director of National Intelligence, DHS, and Department of State (DOS)
- Technical Support Working Group – comprised of members from the DoD and FDA
- Non-Proliferation and Arms Control Technology Working Group – comprised of members from the DoD, DOE, and DOS
- Tri-Agency Committee for Coordination of Homeland Security Science and Technology – comprised of members from the DoD, DHS, and EPA.

The CBDP recognizes that interagency collaboration is crucial to mitigating the broadened threat context to both the military force and civilian populations. The JPEO-CBD contributes to the Biomonitoring MOU by governing the development of a coordinated environmental BW surveillance architecture with the DHS, U.S. Postal Service, DHHS, and EPA.

Within the S&T base, the JSTO-CBD seeks broadest participation from and within the interagency research community. During the solicitation of FY 2010/2011 research proposals, the JSTO-CBD solicited proposals from over 50 U.S. Government laboratories. In addition to the numerous DoD and Service Laboratories, the JSTO-CBD solicited research from the DOE National Laboratories, EPA, FDA, National Aeronautics and Space Administration, and NIH.

The CBDP is working with the CDC and other DoD agencies in an attempt to find solutions that will produce vaccines on demand, in large quantities, and in significantly less time than current manufacturing methods. The goal of the AMP Program is to provide a protein production platform for rapid, large-scale vaccine development in the event of a natural or unnatural biological threat. In addition, the CBMS works with the DARPA to demonstrate pre-clinical human immune responses based on the DARPA's RVA MIMIC artificial immune system. The CBDP will work with the DARPA to assess the utility of transitioning a pre-symptomatic infectious disease detection system from the Predicting Health and Disease (PHD) program.

The DARPA contributes annually to numerous CBRNE reports that involve inter-agency coordination. These reports include the CPRC Report; the Biological Weapons Convention/CWC Compliance Reviews; the Biological Weapons Convention Confidence Building

Measures; and the Interagency Combating WMD Database of Responsibilities, Authorities, and Capabilities. Additionally, the DARPA periodically organizes the DARPA Chemical and Biological Defense Technologies Review, an event which serves as a forum for discussion and presentation of the DARPA's CB defense research portfolio to the DoD.

The CBDP also works with the DHHS to develop a Joint National Stockpile for fielded products and collaborates on numerous developmental products. A National Stockpile exists for the Smallpox (ACAM2000™) and Anthrax (BioThrax™) vaccines. The CBDP is working with the DHHS to refine integrated processes and procedures for ordering, distribution, billing, and payment.

The JPEO-CBD collaborated with the BioWatch Program to collocate DoD and DHS bio-detection technologies on Andrews AFB, MD. The BioWatch Program provides a bio-aerosol environmental monitoring system to our nation's largest cities for early detection of biological attacks. This partnership resulted in several significant initiatives:

- Enhancing assay equivalency work currently underway between the CDC and DoD laboratories
- Developing multi-agency (national and local) CONOPS for event notification – the genesis for developing an expanded CONOPS for the NCR
- Initiating collector re-site activity within the NCR that seeks to optimize DoD and DHS bio-monitoring capabilities – a strong first step in solidifying the National Bio-monitoring Architecture
- Using up to 25 DoD installations with biodetection capability to provide additional BioWatch geographic coverage
- Tri-Agency (DoD/DHS/EPA) Technical Coordination Working Group
- DoD/DHS Capabilities Development Working Group.

The requirement to detect and identify CBRN agents, sources, or compounds rapidly is essentially the same for both military and civilian response. Many threat agents across the military and civilian spectrums are identical, which drives the development of complimentary capabilities and technologies. Training requirements are also similar, and in many cases, identical; the greatest difference is between operational environments. Military environments are normally harsher and more austere, requiring a higher level of ruggedized equipment and greater logistics support. Additional interagency partnerships are outlined in the table on the following page.

Senior Airman Ian Cox–Train, 8th Security Forces augmentee, defends an entry control point with a M16 rifle, wearing MOPP level 4 gear during the BEVERLY BULLDOG 08-03 peninsula-wide operational readiness exercise. (U.S. Air Force photo by Senior Airman Angela Ruiz)

INITIATIVES

- The Military Departments, DoD, and OGAs are working to inform U.S. policy decisions to optimize the balance between risks associated with allowing access to biological select agents and toxins (BSAT) for research and the importance of BSAT research for force and public health protection. Currently, there is ongoing review and evaluation regarding the efficacy and cost/benefit of laboratory security and personnel reliability programs instituted by the DoD and Services since 2001.
- The INBDP Initiative is an integrated, end-to-end national biodefense portfolio for MCM products among the National Institute of Allergies and Infectious Diseases, BARDA, DARPA, and CBDP (JSTO-CBD and JPM-CBMS). The INBDP ensures optimal development and acquisition strategies for CBRN defense to leverage investments, support risk mitigation strategies, and maximize national preparedness. The integrated interagency portfolio, to include the TMTI, will enable cost-sharing, knowledge-sharing, people-sharing, and program sharing to maximize the likelihood of success in the shortest amount of time with the largest impact for the investment dollar.
- The U.S. Government has a requirement for development of MCMs and has been supporting R&D, advanced development, and procurement. The BARDA and the CBDP, which fund and manage CBRN MCM R&D programs, institutionalized the INBDP and created a Portfolio Advisory Committee (PAC). The PAC is comprised of agencies within the U.S. Government that support and conduct research on MCMs against CBRN threats and includes the DHHS (BARDA and NIH) and DoD (JSTO-CBD, JPEO-CBMS, and DARPA) agencies. The PAC is co-chaired by the BARDA and the CBDP, and it oversees the focused review of MCM programs that are supported by the U.S. Government. The PAC is performing a more comprehensive analysis of all U.S. Government MCM pipelines to assess the likelihood of successful licensure of one or more of potential candidates.
- Construction proceeded in FY 2009 on the Sample Receipt Facility (SRF) - a uniquely specialized sample handling, analysis, and forensics facility nearing completion at the ECBC on the Edgewood Area of Aberdeen Proving Ground (APG), MD. The SRF is a collaborative effort, funded by the DoD, DHS, and Federal Bureau of Investigation.
- The DARPA PHD Program seeks to determine methods of detection and diagnosis of a disease prior to the onset of symptoms. Investigators are evaluating mucus, breath, and other readily available biological products to determine whether accurate diagnoses can be made from less invasive measurements.

CBDP Enterprise Interagency Relationships

DARPA	As it relates to CBDP, the DARPA develops revolutionary new detection, diagnostics, and decontamination of CB threats. The DARPA's programs are intended to complement the CBDP by anticipating and developing novel defenses against future threats. The DARPA invests primarily in early technology development phases and the demonstration of prototype systems.
CPRC	Interagency executive committee that reports on activities and programs to combat WMD.
Technical Support Working Group	Interagency forum that identifies, prioritizes, and coordinates interagency and international R&D requirements for combating terrorism.
DHS (S&T Directorate)	Primary R&D arm of the DHS that guides and organizes research efforts to meet emerging and predicted needs.
DHHS	Under Project Bioshield/the BARDA, the DHHS conducts research, development, and procurement of safe and effective CBRN medical countermeasures. The CBDP and DHHS work cooperatively in these endeavors.
CDC	The CDC, an agency of the DHHS, supports the United States by managing the SNS. The DoD acquires Smallpox and Anthrax vaccine from the SNS. The CDC and DoD work together in the refinement of their respective Bio-surety programs.
EPA	The EPA is responsible for remediation and recovery of critical infrastructure following an attack with WMD as well as for protecting the nation's water supply from accidental or deliberate contamination.

ACCOMPLISHMENTS

- The DoD now acquires Anthrax Vaccine Adsorbed (BioThrax™) and ACAM2000™, the newly licensed Smallpox vaccine that replaced Dryvax™, from the SNS via Economy Act orders.
- In December 2008, the DoD and DHS signed a MOU on areas of cooperation in CB defense. The DoD and DHS developed a MOU implementation work plan which the EPA has agreed to sign in order to enhance communications and leverage the capabilities of the other departments. This MOU will encourage and enable the agencies to more quickly establish Joint projects, exchange data, and coordinate or co-fund programs of mutual interest without having to establish separate agreements each time. The work plan's initial priority is to conduct an interdepartmental portfolio analysis to identify potential gaps, eliminate unnecessary duplication of effort, and maximize existing capabilities. The FY 2009 - 2010 MOU work plan identifies six tasks to enhance CB defense cooperation between the departments and agencies.
- Conducted a successful TTX in March 2009 for the IBRD Analyzer for Wide Area Restoration Effectiveness Enhancements restoration planning tool. The IBRD is a joint program between the DoD and the DHS.
- The Service Staff Directors established the Inter-Service Council for Biosecurity and Biosafety (ICBB) Charter in October 2008. The ICBB focused on Service policies, procedures, and activities to ensure compliance with DoD policies on biosecurity, biosafety, and personnel reliability; provided recommendations for improvements in key biosecurity, biosafety, and personnel reliability policy and procedural issues to the Services; ensured each Service conducted an internal review of biosecurity, biosafety, and personnel reliability policy and implementation; and oversaw that each Service assessed requirements to maintain a BSAT laboratory infrastructure. The ICBB formed a task force with working groups composed of subject matter experts from across the Services and DoD. The following focus areas were reviewed:
    - Transportation of BSAT
    - Biological Safety
    - Biological Security/Physical Security
    - Inspections
    - Personnel Reliability Program/Foreign Personnel
    - Inventory/Accountability of BSAT
    - Training of Personnel
- Review of the focus areas indicated the Services' policies, regulations, standards, and procedures in effect before August 2008 met or exceeded all federal and DoD requirements. However, the Services agreed to establish common standards in each area. Each Service conducted an internal review of biosecurity, biosafety, and personnel reliability policy and implementation. Results of the internal reviews remained with the Services, but did provide information for analysis and development of recommendations within each focus areas.

INNOVATIONS

- Co-location of DoD and DHS assets: The DHS Chemical Security Analysis Center was established at APG, and the DHS National Biodefense Analysis and Countermeasures Center was set up at Fort Detrick, MD. These facilities have advanced communication and personnel/technical expertise sharing between the agencies.
- Joint funding of technical projects: Many projects have potential application to both military defense and homeland security. The CBDP has started co-funding projects with other agencies, such as the DHS, the DARPA, and the EPA. This allows access to more technology within the budget while strengthening government oversight due to the involvement of multiple SMEs from different agencies. This further promotes transfer of technology from R&D to fielded application as project funding transitions from early-phase agencies to acquisition-oriented agencies. Duplicative funding of a project by different agencies is also reduced by this approach.
- The DoD, EPA, and DHS are standing up a working group to explore ways to accelerate and expand the integration of technology development among the agencies. The group is considering traditional and non-traditional ways to enhance cooperation among the agencies' principal investigators and PMs.
- The DARPA's AMP Program is revolutionizing vaccine development by providing the first ever large-scale emergency response vaccine and antidote manufacturing process to protect U.S. forces against biological threats, ranging from intentional biowarfare to a rapidly emerging pandemic.
- The DARPA's Rapid Altitude and Hypoxia Acclimatization (RAHA) program aims to demonstrate innovative approaches to accelerate natural acclimatization at high altitudes (4,000 - 6,000 meters) and alleviate the effects of high altitude illnesses and hypoxia. Additionally, RAHA is developing strategies for countering the lethal effects of hypoxia associated with lung injury as occurs with pandemic influenza, avian influenza, and aerosolized biological weapon-induced acute respiratory distress syndrome.

Joint International Efforts

The CBDP leverages international programs to gain access to foreign technology and infrastructure, mitigate risk in the R&D process, and establish multi-national standardized test procedures and common data. The two main objectives of international cooperative CBRN defense programs are to reduce defense system acquisition costs through collaboration in the areas of S&T, development, production, and support; and to enhance interoperability with coalition partners. The magnitude of these cooperative efforts covers all of the capability areas of CBRN defense (i.e., sense, shape, shield, and sustain).

In September 2007, the CBDP broadened its international reach by drafting a multilateral Strategic Implementation Plan and Roadmap to the year 2025 for the AUS/CAN/UK/US CBR MOU. This effort allows expanded CBDP information exchange with AUS/CAN/UK/US. As part of the international outreach, the CBDP participated in a series of meetings, working groups, and Interagency Task Forces, interacting with Israel, Singapore, Poland, Sweden, Japan, Thailand, and NATO nations. All of these interactions allow for increasing information exchange, developing cooperative relationships, and ensuring program efficiencies.

The CBDP greatly benefits from international T&E collaboration in the CBR arena under the auspices of the TESWG, which is chartered by the AUS/CAN/UK/US CBR MOU and chaired by the Army TEO. The TESWG meets bi-annually and is working to provide Multi-National Test Operating Procedures as well as identifying opportunities for collaboration on test events and sharing of test data.

The Technical Cooperation Program (TTCP) recently celebrated 50 years of collaboration. TTCP is a multilateral exchange vehicle with Australia, Canada, New Zealand, and the United Kingdom, and JSTO-CBD Chairs the subgroup for CBR Defense. This premier S&T exchange forum provides for extensive collaborative efforts through technical panels and action groups that focus on aspects of basic and applied research for many areas important to the CBDP. These groups address research in detection, protection, hazard assessment, decontamination, and contamination avoidance. They also collaborate on MCMs, including both pretreatments and therapeutics, as well as assay development for rapid diagnostics.

The CBDP is actively involved in numerous cooperative efforts in CBRN defense requirements, technology, and material developments through bilateral, multi-lateral, and allied agreements and structures. These include: TTCP; CBR MOU activities; the NATO Joint Capability Group on Chemical, Biological, Radiological, and Nuclear Defence (JCG-CBRN) activities; the NATO Research and Technology Organization (RTO); and bilateral forums with the United Kingdom, Japan, Singapore, Czech Republic, Israel, Australia, Republic of Korea, and other countries with CB defense efforts. These venues link the CBDP to government, military, and non-military RDT&E partners involved in CBRN defense material development efforts. The JPEO-CBD participates in the foreign military sales process ensuring increased interoperability. The JSTO-CBD participates in cooperative S&T development through information exchanges and collaborative research efforts. Cooperative development activities under these programs reduce U.S. development costs through burden sharing and leveraging of others' significant investments in CBRN defense and increase access to the broadest panoply of CBRN defense technologies.

The CBDP is increasing to leverage of existing DoD and broader U.S. Government presence throughout the world as it searches for the best science and most advanced technologies to meet evolving program requirements. Through more than 34 offices with a presence in 21 countries on six continents, the CBDP actively focuses on its external partners to ensure that it is aware of all potentially beneficial technologies to meet CBRN defense requirements. Additionally, the CBDP works with other U.S. Government agencies participating in CBRN defense technology developments globally. Together, these efforts will ensure an ability to identify, assess, develop, and exploit military and civilian technology and material developments in CBRN defense on a global basis at the service of DoD needs.

The CBDP continues to identify and leverage global capabilities that address program requirements. Such cooperation is critical to ensure access to the best and most pioneering CBRN defense research and technologies available worldwide and to integrate equipment and procedures with U.S. allies. The CBDP effectively leverages international programs to gain unique access to foreign research, technology, and infrastructure to mitigate risk in the R&D process and establish multinational standardized test procedures. International agreements provide the legal and procedural framework for international cooperation in CB defense. Furthermore, the CBDP participates as a DoD representative in the following activities:

- AUS/CAN/UK/US CBR MOU
- Joint Venture Oversight Group – United Kingdom
- NATO JCG-CBRN and other NATO venues
- Counterproliferation Working Groups (CPWG)
  - United States-Israel
  - United States-Singapore
  - United States-Republic of Korea
- United States-Japan Chemical and Biological Defense Working Group (CDWG)
- Senior National Representatives-Army with eight countries when CB defense issues are on the agenda.

Specifically, the JPEO-CBD is signatory to the following agreements:

- Plague vaccine Project Agreement (PA) with the United Kingdom and Canada (JPM-CBMS)
- PA on ColPro with the United Kingdom
- Engineer and Scientist Exchange Program (ESEP) with Germany.

The JPEO-CBD leverages other DoD international S&T offices located overseas to identify technologies that meet its requirements. These include the following:

- Six Army International Technology Centers
- Four Office of Naval Research Global Offices
- Four Air Force Office of Scientific Research Offices
- Army and Navy medical community offices
- U.S. Army Corps of Engineers offices
- Yuma overseas presence.

The JSTO-CBD manages and executes CBDP International S&T activities, including the following:

- Promoting collaboration and harmonization of CB defense S&T International research activities.
- Developing and managing CB defense S&T international agreements including Information Exchange Agreements (IEAs), data exchange agreements, PAs, the ESEP, and equipment and materiel transfers with numerous countries including the United Kingdom, Singapore, Australia, Israel, Canada, New Zealand, and the Czech Republic.
- Concluding a new IEA with the Czech Republic, allowing for the exchange of R&D information addressing defense against WMD. Specifically, information exchanged under this IEA includes approaches, techniques, technologies, testing, M&S, and assessment methodologies in the areas of nonproliferation, counterproliferation, and consequence management that will support countering WMD and homeland defense strategies.
- Initiating two PAs with Singapore and the Republic of Korea. These PAs will provide for the execution of cooperative research, development, and testing for environmental fate of agents and the evaluation of field portable diagnostics for low-level chemical exposures.
- Serving as the S&T representative on visits to Indian technical facilities to determine possible collaborative opportunities in the areas of CB countermeasures and MCMs to radiological exposure.
- Serving as the national lead and Executive Chair for TTCP CB Defense Group. Collaborative areas as well as scientist, equipment, material, and information exchange under this subgroup include the following:
  - Technical Panel (TP)-4 BW Medical Countermeasures
  - TP-9 Hazard Assessment
  - TP-10 Detection of Biological Agents
  - TP-11 IP
  - TP-14 Rapid Diagnostics
  - TP-15 Hazard Management
  - Action Group (AG)-53 Agent Fate
  - AG-54 Virtual Battle Space.
- Increasing the level of cooperation in development of novel IPE through enhanced burden sharing and equipment and material transfers. This year, the technical panel exchanged novel sealant material, novel suit materials, and new filter materials. The participants will use these materials to influence development of improved IPE with reduced physical burden, which will benefit our Warfighters.
- Playing a critical role as the U.S. representative in the R&D subgroup under the United States - Japan CDWG, which is working towards human effects extrapolation from animal models using a physiologically based pharmacokinetic model in support of a decontamination subgroup task.

Joint training between the USSOCOM and the Korean Special Forces in JSLIST overgarments.

- Participating in all CBDP-related NATO RTO activities:
  - Sensors and Electronics, particularly dealing with Sensor and Electronic Technology Systems Analysis and Studies
  - Human Factors in Medicine.
- Leading S&T activities in support of Office of the Under Secretary of Defense Counterproliferation Policy led groups such as the CPWG and the CDWG:
  - United States-Israel
  - United States-Singapore
  - United States-Republic of Korea.

The CBDP supports a policy of cooperation and collaboration that recognizes the importance of allies in the effort to develop capabilities to counter WMD. International cooperation fosters the relationships necessary to achieve mutual benefits regarding costs and interoperability. Clearly, it remains in the United States' interest to continue international cooperative CB defense programs.

ACCOMPLISHMENTS

- The NATO Allied Engineering Publication-7 was reviewed to provide the capability development and materiel acquisition community with guidelines, test procedures, and acceptance criteria for designing military equipment. These guidelines were provided to ensure that materiel used on the battlefield will survive CBRN hazards and can be operated by personnel in a protective posture. This publication also provides information regarding the impact of decontamination on different materials. The Services and the JRO-CBRND doctrine representatives deliberated on and agreed on this keystone multi-Service doctrine for CBRN operations publication. The Joint Hazard Management Sub Group, under the JCG-CBRN, completed a revision of Allied Engineering Publication-7 that has been submitted to the NATO JCG-CBRN for entry into the ratification process.
- TTCP TP-4 (Medical Countermeasures for Biological Agents) generated vaccine candidates against Brucella and Burkholderia and the viral agent Western Equine Encephalitis. These candidates represented the first steps to FDA licensed vaccines against these BW agents. This panel has been submitted for a team excellence award based on this accomplishment, which will benefit Warfighters from the United States and Allied nations.
- Completed the CBR MOU Master Roadmap to the year 2025 that identifies each member countries' capabilities, aligns national priorities, and identifies and prioritizes the Implementation Plan and Roadmap developed in 2007. The MOU needs to be brought into force by each member country, after which it will serve to guide the establishment of new international working groups, Joint development or T&E projects, and possible Joint acquisitions.
- Following a thorough, detailed program review by the JPM-CBMS, the JPEO-CBD decided to solely fund the development of the U.S. plague vaccine candidate through FDA licensure. Both the United Kingdom Ministry of Defence and the Canadian Department of National Defence concurred with this decision, and a new project arrangement under the CBR MOU was signed in November 2009.

INITIATIVE

The IBRD program is a collaborative DoD (DTRA) and DHS S&T effort to improve the nation's ability to restore a wide urban area following a large biological aerosol attack. The IBRD program will enhance scientific understanding, create consequence management plans/guidance, and develop technologies for wide area restoration with the object of reducing time and resources required for restoration. Due to the universal nature of wide area restoration challenges, the program's goals are valuable for both civilian and military applications. At the same time, the program is focused on understanding the interactions and dependencies between civilian and military doctrine and response and in building mutual civilian-military support for carrying out wide area bio-restoration. This four-year program was started in 2007 and will culminate in a Finale Event in the Fall of 2010.

Chemical Weapons Convention

The CWC opened for signature on January 13, 1993 and entered into force on April 29, 1997. As of October 2009, 188 countries, including the United States, are member states of the CWC. The CWC establishes a timeline for the complete destruction of chemical weapons by April 2007 and allows for a one time, five year extension. The U.S. Government requested and was granted the maximum extension allowed setting the new timeline for complete destruction by April 2012.

The 14th session of the Conference of the States Parties, the highest policy-making organ of the Organisation for the Prohibition of Chemical Weapons (OPCW), convened in The Hague, Netherlands from November 30 - December 4, 2009. The Conference's main agenda item was the selection of Turkish Ambassador Ahmet Üzümcü as the next Director-General of the OPCW Technical Secretariat (TS). He will succeed Ambassador Pfirter in July 2010.

The OPCW is charged with overseeing worldwide implementation of the CWC, and includes an international staff of approximately 300 employees. TS inspectors conduct continuous and non-continuous monitoring at CW destruction facilities and systematic inspections at CW storage and former CW production facilities. TS inspectors also conduct random systematic inspections of permitted chemical agent and precursor production facilities declared to the OPCW.

In 2009, the DoD hosted 91 inspections and visits at CW storage, destruction, and Schedule 1 chemical production facilities. The Army and the DTRA continue to host and escort inspectors from the OPCW TS when inspecting or visiting DoD facilities. The DoD completed the destruction of the last of its former CW production facilities in 2007. The OSD, Joint Staff, Services, and the DTRA provide experts to support the activities of the U.S. Delegation to the OPCW in The Hague.

The DTRA provides CWC orientation training and associated mission-support training (i.e., treaty escort, HAZMAT, and Hazardous Waste Operations and Emergency Response Training) to U.S. Government national escorts and other treaty compliance personnel. The DTRA ensures that all escorts are trained and ready to receive OPCW TS inspection teams.

The Department of Commerce (DOC) is the lead agency for chemical industry inspections and provides escort services for inspections of non-DoD facilities. The DTRA continues to support the DOC with inspections of OPCW equipment. The OPCW TS conducted 21 inspections of U.S. chemical industry facilities in 2009.

Ongoing Efforts

The DoD conducts a Chemical Weapons Implementation Working Group (CWIWG), chaired by the DoD CWC Treaty Manager to garner understanding and consensus of the issues related to CWC implementation. Representatives include the OSD, Joint Staff, Services, and DoD agencies. The Treaty Management Support Office schedules small group meetings as needed to address specific requirements in support of the CWIWG.

A CWC Compliance Review Group (CRG), also chaired by the DoD Treaty Manager, was established within the DoD to address CWC compliance concerns, as needed. The CRG met several times during 2009 to address the compliance of planned activities within the DoD.

The U.S. Army Chemical Materials Agency (CMA) has the mission to destroy U.S. CW stockpiled material located in Anniston, AL; Pine Bluff, AR; Umatilla, OR; and Tooele, UT. The CMA has completed destruction of all chemical weapons formally stored at Johnson Aberdeen, MD; Newport, IN; and Dugway, UT, under continuous monitoring by OPCW inspection teams. The remaining CMA sites are on pace to complete destruction operations in 2012. The DoD's Assembled Chemical Weapons Alternatives (ACWA) Program has the responsibility to destroy the CW stockpile material at Blue Grass, KY and Pueblo, CO. The ACWA sites are currently scheduled to complete destruction operations in 2017 and 2021. Both CMA and ACWA work through the OSD to ensure maximum protection of the public and the environment. DoD will continue to look for opportunities to eliminate the remaining chemical weapons stockpile ahead of current schedules without sacrificing safety and security.

Pursuant to an OPCW condition of the U.S. deadline extension and in coordination with the DOS, the DoD is hosting the Chairman of the Executive Council (EC), along with representatives from the EC's other regional groups. Visits are required to active and under-construction chemical weapons destruction sites. In 2009, the DoD hosted the OPCW Director-General and five EC representatives at DoD facilities in Pueblo, CO and Umatilla, OR. The DoD will continue to periodically host these visits until the completion of CW destruction operations.

Safety Orientation for Inspectors

All OPCW inspectors who conduct continuous monitoring at U.S. chemical demilitarization facilities, and their DTRA escorts, are required to attend a 32-hour safety orientation. This orientation, presented by the Army, is divided into two sections: a 24-hour health and safety orientation (HSO) course, which is a U.S. Government requirement for all personnel who must be present on a more than short-term basis at U.S. chemical demilitarization facilities; and an eight-hour ammunition safety course. A 48-hour demilitarization protective ensemble (DPE) procedures course is required only for those inspectors designated by the OPCW TS, whose responsibilities would include the use of such protective equipment. Because this is a DoD safety requirement, the training is conducted and funded by the DoD.

Roughly 180 OPCW TS inspectors attended either one of the 10 eight-hour annual HSO refresher classes or one of the two 24-hour HSO courses in 2009. The HSO training is normally conducted in The Hague, but may be conducted at the Chemical Defense Training Facility (CDTF) at APG. The DPE course is conducted at the CDTF. The DTRA provides U.S. Government national escort support for OPCW inspectors while they attend required training in the United States. The DTRA ensures that all inspectors receive the required training.

Preparation of Defense Installations

The DoD, Military Departments/Services, and Components have developed individual CWC implementation and compliance plans to provide guidance for their commands and activities. The Services have individually established implementation support offices, which participate actively at the DoD CWIWG, provide Service policy direction, and liaise with their major commands to ensure that all military elements are fully prepared for inspections under the CWC.

The Services continue to coordinate actively with the OSD and DTRA to prepare DoD installations for inspections under the CWC. All defense installations are subject to declarations under CWC requirements. Installations that are subject to challenge inspections, even though not declarable, have been visited by Service representatives and DTRA technical experts. The DTRA will continue to support site assistance visits and Army treaty implementation and compliance meetings.

All Services have held exercises to test their preparedness for short-notice CWC challenge inspections. Such exercises involve the active participation of Services, OSD, DTRA, and other DoD representatives in the roles that they would assume during a challenge inspection. The DoD and the Services have exercised written DoD guidance and procedures to test the operational readiness of personnel and facilities. The Services have initiated efforts to ensure that in the case of a challenge inspection, affected commands take timely and appropriate measures, based on lessons learned, to demonstrate compliance while protecting security concerns.

In coordination with the Air Force, the DoD sponsored a seven-day mock challenge inspection exercise in 2009, using Kirtland AFB, NM as the inspection site. The DoD's overall objective was to validate operational procedures for the National Escorts, the Army's installation advance teams, and the Air Force's base assistance teams, as well as exercise DoD compliance guidance, the CRG process, public affairs guidance, and the host team's internal operations process. Interagency partners (e.g., DOS, DOC, DHHS, DOE, Department of Justice, etc.) either observed or participated in the exercise.

ACCOMPLISHMENT

In 2009, the ECBC's Research and Technology Directorate participated in and scored an "A" on the 25th OPCW Proficiency Test. This is the highest grade achievable, with no false positives/false negatives in the identification of nine reportable compounds in six samples reflecting potential challenge inspection scenarios. The ECBC Forensic Analytical Center and the Lawrence Livermore National Laboratory Forensic Science Center are the two designated U.S. laboratories for analytical support of challenge inspection and proficiency tests under the CWC.

Defense Treaty Inspection Readiness Program

The Defense Treaty Inspection Readiness Program (DTIRP), for which the DTRA is the executive agent, provides arms control implementation advice and assistance to sites subject to onsite inspection using specially trained personnel, analyses, and educational activities. In 2009, the DTIRP supported the U.S. Army CMA, Defense Security Service Academy, and other Services to provide arms control security advice and tailored training for new personnel. The DTIRP has provided, and will continue to provide, arms control vulnerability assessment teams in support of any requirement to assess risks to critical national security assets, U.S. industry, and research institutions. Program personnel are actively engaged throughout the arms control and security arenas to remain current and focused on present arms control security challenges.

Technical Equipments Inspection Program

To carry out its CWC verification activities, the OPCW TS purchases, maintains, and transports its own equipment. The Technical Equipment Inspection (TEI) Program ensures that OPCW TS verification equipment meets U.S. safety, environmental, and security requirements through a familiarization process authorized by the OPCW Conference of States Parties. Familiarization results are documented in the U.S. Certification Report of CWC OPCW TS Equipment. The TEI verifies OPCW equipment entering and exiting the United States in accordance with the U.S. Certification Report. In addition, the TEI performs chemical agent monitoring of inbound equipment for all inspection teams at the point of entry to protect U.S. and OPCW personnel and prevent inaccurate findings resulting from preexisting contaminants on the OPCW verification equipment.

Air Force Emergency Manager practicing use of the HAZMAT identification equipment during training.

Aerial photo of the Pentagon, the Headquarters of the DoD. Completed in 1943, it houses approximately 23,000 employees, both military and civilian.

Article X Assistance and Other Assistance

Under Article X of the CWC, a State Party to the treaty may make an appeal for assistance through the Director-General of the OPCW. In accordance with a condition established in the U.S. Senate's Advice and Consent to the Ratification of the CWC, the United States will provide "no assistance…other than medical antidotes and treatment," which the U.S. Government deems necessary to those CWC States Parties that have requested assistance under Article X of the CWC.

Under the CWC, the DoD has provided neither CW detection equipment nor assistance in the transportation, storage, and destruction of CW to other States Parties, except that which has been provided to Russia and Albania under the DoD's Cooperative Threat Reduction Program and the ongoing destruction of recovered chemical weapons in Iraq by the U.S. Armed Forces.

The integration of the international and interagency communities facilitates interoperability and maximizes the effectiveness of CBDP capabilities. This partnership provides numerous benefits: an increased knowledge base, expanded access to technology and infrastructure, data sharing, and standardized multinational test procedures while assuring the judicious utilization of CBDP resources. In so doing, the communities cooperatively develop, test, select, field, and leverage CB defense capabilities for the Warfighter.

Summary

Over the course of 2009, the CBDP continued to accomplish its primary goals for providing operational capabilities to the Joint Force, defining and developing transformational capabilities, sustaining the Force to operate jointly and effectively, and improving management practices to fulfill enterprise strategic roles and missions. The CBDP has made significant progress over the last year to protect our nation from current and emerging CBRN threats. The focus of the CBDP enterprise continues to center on:

- Providing rapid response to the needs of the Warfighter
- Advancing the S&T of CBRN defense
- Leveraging resources and intellectual capital across the full spectrum of federal agencies and allied international partners.

The CBDP is dedicated to maintaining the defensive capabilities of the U.S. Armed Forces and ensuring that DoD operations are unhindered by WMD threats and environments. The CBDP continues to develop initiatives and technologies that build the readiness of the DoD to operate and win in CBRN environments. Our efforts focus not only on the traditional CB threats of today, but also the dynamic emerging CBRN threats of tomorrow. The enemies of the United States, our national interests, and our allies are clever and adaptive, and the CBDP must be the same.

To remain effective and provide the necessary defensive capabilities for the U.S. Armed Forces and for overlapping Homeland Defense needs, the CBDP depends upon continued congressional support. Several priority areas must be sustained to ensure that the CBDP can continue to execute its mission and meet the national priorities listed below:

- Adequate and stable resourcing to ensure acquisition and fielding of improved defensive capabilities, guaranteeing that military operations are unimpeded by CBRN threats and environments
- Sufficient long-term investment in infrastructure to enhance RDT&E capabilities to support development of advanced countermeasures against current and emerging threats and to ensure that test capabilities critical to the success of the JPMs and operational test agencies can be delivered
- Stable funding to leverage fully advanced S&T innovations needed to address emerging CBR threats and weapons that may be seen on the battlefield or in the homeland
- Necessary resources to support continued transition to the new FPC, strengthening our capabilities to wage multiple concurrent campaigns, and ensuring sustainment and support of fielded CBDP equipment and consumables.

Path Forward

The CBDP will continue its mission of providing integrated, coordinated, and sustainable solutions to the Warfighter for current and emerging CBRN threats. Current and future requirements will demand that the best technology is used to develop advanced defensive capabilities. Our goal of enhancing the CBRN defense capabilities of the U.S. Armed Forces and improving the preparedness and operability of our Warfighters will be supported by the following major initiatives:

- Next-generation CB stand-off detection and early warning technologies
- Integrated chemical mapping of battlefield and urban environments
- Research into advanced protective garments and self-decontaminating coatings
- Expanding our portfolio of simulants and model development for enhanced assessments
- Advanced medical, chemical, and radiological countermeasures
- Improved air filtration and purification for protection systems
- New decontaminant compounds, systems, and strategies
- Innovative biological pretreatments, viral vaccines, diagnostics, and therapeutics.

To ensure that the CBDP continues to meet its public obligation to maximize the efficient use of program funding while executing its mission, the Program will also undertake the following initiatives to maximize the effectiveness of our efforts, including:

- Expanding partnerships within the Military Departments/Services, as well as across OGAs and with allied nations, to expand collaborative efforts and maximize impact
- Integrating a FoS approach to future capabilities developments
- Utilizing a needs-based research investment strategy for basic information, surface, chemical, biological, and nano-scale science needs
- Undertaking continuous business process improvement efforts to streamline the acquisition process while still ensuring maximum program oversight
- Maximizing ROI through enterprise solutions and economic order quantity purchasing
- Reducing lifecycle operations and maintenance costs by minimizing energy consumption and logistics burdens.

The CBDP will continue to develop the cutting edge of CBRN defensive capabilities in anticipation of evolving and emerging threats to our nation, including NTAs, TICs, TIMs, genetically engineered pathogens, and agents specifically designed to defeat existing countermeasures. With the support of our President, Congress, and the Secretary of Defense, we will steadfastly continue our efforts to develop and expand our capabilities both on the battlefield and at home in defense of our nation.

Acronyms

A

AChE	Acetylcholinesterase
ACM	Assessment and Consequence Management
ACTD	Advanced Concept Technology Demonstration
ACWA	Assembled Chemical Weapons Alternatives
AFCESA	Air Force Civil Engineer Support Agency
AFIMS	Air Force Incident Management System
AFRL	Air Force Research Laboratory
AG	Action Group
AMC	Air Mobility Command
AMedP	Allied Medical Publication
AMP	Accelerated Manufacture of Pharmaceuticals
AoA	Analysis of Alternatives
APB	Acquisition Program Baseline
APG	Aberdeen Proving Ground
ARC	Annual Report to Congress
ARNORTH	U.S. Army North
ASC	Active Stand-off Chamber
ATD	Advanced Technology Demonstration
ATSD(NCB)	Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs
AUS/CAN/UK/US	Australia, Canada, United Kingdom, and United States

B

BARDA	Biological Advanced Research and Development Authority
BSAT	Biological Select Agents and Toxins
BW	Biological Warfare
BWA	Biological Warfare Agent

C

C2	Command and Control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CATOX	Catalytic Oxidation
CB	Chemical and Biological
CBA	Capabilities Based Assessment
CBART	Chemical and Biological Agent Resistance Test
CBDEWS	Chemical and Biological Distributed Early Warning Strategy
CBDP	Chemical and Biological Defense Program
CBIRF	Chemical Biological Incident Response Force
CBR	Chemical, Biological, and Radiological
CBR MOU	Chemical, Biological, and Radiological Memorandum of Understanding
CBRN	Chemical, Biological, Radiological, and Nuclear
CBRND	Chemical, Biological, Radiological, and Nuclear Defense
CBRNE	Chemical, Biological, Radiological, Nuclear, and (High-Yield) Explosive
CBRN-IRC	Chemical, Biological, Radiological, and Nuclear Information Resource Center
C-CBRN	Counter-Chemical, Biological, Radiological, and Nuclear
CCSI	Common CBRN Sensor Interface
CDC	U.S. Centers for Disease Control and Prevention
CDTF	Chemical Demilitarization Training Facility
CDWG	Chemical and Biological Defense Working Group
CHEMRAT	Chemical Hazard Estimation Method and Risk Assessment Tool

CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CMA	Chemical Materials Agency
CMWDS	Counter Measure Wash Down System
CoIPro	Collective Protection
CONOPS	Concept of Operations
CONUS	Continental United States
COPR	Competitive Prototype
COTS	Commercial Off-the-Shelf
CP DEPMEDS	Chemically Protected Deployable Medical System
CPD	Capability Production Documet
CPFH	Collectively Protected Field Hospital
CPWG	Counterproliferation Working Group
CRG	Compliance Review Group
CRP	Critical Reagents Program
C-RW	Counter-Radiological Warfare
CSIP	Congressional Special Interest Program
C-SPA	CBRN Small Product Acquisition
CST	Civil Support Team
CTA	Capability Transition Agreement
CUGV	CBRN Unmanned Ground Vehicle
CW	Chemical Warfare
CWA	Chemical Warfare Agent
CWC	Chemical Weapons Convention
CWIWG	Chemical Weapons Implementation Working Group
CWMD	Combating Weapons of Mass Destruction

D

DARD	Defense Accountability, Reutilization, and Disposal Project
DARPA	Defense Advanced Research Projects Agency
DATSD(CBD/CD)	Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense and Chemical Demilitarization
DHHS	U.S. Department of Health and Human Services
DHS	U.S. Department of Homeland Security
DLA	Defense Logistics Agency
DNA	Deoxyribonucleic Acid
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DOE	U.S. Department of Energy
DOS	U.S. Department of State
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities
DPE	Demilitarization Protective Ensemble
DPG	Dugway Proving Ground
DRRS	Defense Readiness Reporting System
DSS	Decision Support System
DTC	Dynamic Test Chamber
DTIRP	Defense Treaty Inspection Readiness Program
DTL&E	Doctrine, Training, Leadership, and Education
DTRA	Defense Threat Reduction Agency
DUSA-TEO	Deputy Under Secretary of the Army-Test and Evaluation Office

E

ECBC	Edgewood Chemical Biological Center
EEE	Eastern Equine Encephalitis
EPA	U.S. Environmental Protection Agency
ESEP	Engineer and Scientist Exchange Program
EUA	Emergency Use Authorization
EZ	Exchange Zone

F

FDA	U.S. Food and Drug Administration
FoS	Family of Systems
FPC	Force Planning Construct
FRP	Full Rate Production

G

GD	Soman Nerve Agent
GO/FO	General Officer/Flag Officer
GSC	Global Synchronization Conference

H

HaMMER	Hazard Mitigation, Materiel and Equipment Restoration
HAZMAT	Hazardous Material
HD	Sulfur Mustard Gas
HFV	Hemorrhagic Fever Virus
HRDS	Human Remains Decontamination System
HSO	Health and Safety Orientation
HSPD	Homeland Security Presidential Directive

I

IAP	Investment Assessment Process
IB	Industrial Base
IBRD	Interagency Biological Restoration Demonstration
ICB	Intracellular Bacterial Pathogen
ICBB	Inter-Service Council for Biosecurity and Biosafety
ICD	Initial Capabilities Document
IEA	Information Exchange Agreement
INATS	Improved Nerve Agent Treatment System
INBDP	Integrated National Biodefense Medical Countermeasures Portfolio
IND	Investigational New Drug
IOP	International Oversight Panel
IP	Individual Protection
IPE	Individual Protective Equipment
IPT	Integrated Product Team
ISO	International Organization for Standardization
ISS	Individual Survival Standards
IT	Information Technology
IUID	Item Unique Identifier

J

JABT	Joint Ambient Breeze Tunnel
JACKS	Joint Acquisition CBRN Knowledge System
JACKS-RW	Joint Acquisition CBRN Knowledge System Reporting Warehouse
JBAIDS	Joint Biological Agent Identification and Diagnostic System
JBPDS	Joint Biological Point Detection System
JBSDS	Joint Biological Stand-off Detection System
JC3	Joint CB Coverall for Combat Vehicle Crewmen
JCAD	Joint Chemical Agent Detector
JCB	Joint Capabilities Board
JCD-CBRND	Joint Combat Developer for Chemical, Biological, Radiological, and Nuclear Defense
JCG-CBRN	Joint Capability Group on Chemical, Biological, Radiological, and Nuclear Defence
JCIDS	Joint Capabilities Integration and Development System
JCPE	Joint Collective Protection Equipment
JCSD	Joint Contaminated Surface Detector
JCTD	Joint Capability Technology Demonstration
JCWMDFC	Joint Combating Weapons of Mass Destruction Familiarization Course
JEAP	Joint Equipment Assessment Program
JECE	Joint Elimination Coordination Element
JEM	Joint Effects Model

JILA	Joint Independent Logistics Assessments
JMDS	Joint Materiel Decontamination System
JMDSE	Joint Medical Distance Support and Evacuation
JMR	Joint Materiel Release
JNBCRS	Joint Nuclear Biological Chemical Reconnaissance System
JP	Joint Publication
JPD	Joint Potential Designator
JPEO-CBD	Joint Program Executive Office for Chemical and Biological Defense
JPL	Joint Priorities List
JPM	Joint Project Manager
JPM-BD	Joint Project Manager for Biological Defense
JPM-CBMS	Joint Project Manager for Chemical and Biological Medical Systems
JPM-ColPro	Joint Project Manager for Collective Protection
JPM-Decon	Joint Project Manager for Decontamination
JPME	Joint Professional Military Education
JPM-Guardian	Joint Project Manager for Installation Force Protection
JPM-IP	Joint Project Manager for Individual Protection
JPM-IS	Joint Project Manager for Information Systems
JPM-NBC CA	Joint Project Manager Nuclear, Biological, and Chemical Contamination Avoidance
JROC	Joint Requirements Oversight Council
JRO-CBRND	Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense
JSAM-RW	Joint Service Aircrew Mask-Rotary Wing
JSF	Joint Strike Figher
JSFDS	Joint Service Family of Decontamination Systems
JSGPM	Joint Service General Purpose Mask
JSLIST	Joint Service Lightweight Integrated Suit Technology
JSTDS-SS	Joint Service Transportable Decontamination System-Small Scale
JSTO-CBD	Joint Science and Technology Office for Chemical and Biological Defense
JTF-CS	Joint Task Force-Civil Support
JTF-E	Joint Task Force-Elimination
JUONS	Joint Urgent Operational Needs Statement
JWARN	Joint Warning and Reporting Network

K

KPP	Key Performance Parameter

L

LCD	Lightweight Chemical Detector
LCM	Life Cycle Management

M

M&S	Modeling and Simulation
MACS	Mission Adaptable Chemical Sensors
MADCP	Mortuary Affairs Decontamination Collection Point
MAGTF	Marine Air Ground Task Force
MBR	Medical Basic Research
MCM	Medical Countermeasure
MCO	Marine Corps Order
MCRP	Marine Corps Reference Publication
MCWP	Marine Corps Warfighting Publication
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MDD	Materiel Development Decision
MEF	Marine Expeditionary Force
MFTT	Materiel Fielding Tracking Tool
MIMIC	Modular Immune *in vitro* Constructs
MIST	Man-in-Simulant Test
MOD	Modernization
MOPP	Mission-Oriented Protective Posture
MOS	Military Occupational Specialty
MOU	Memorandum of Understanding
MS	Milestone
MTTP	Multi-Service Tactics, Techniques, and Procedures

N

NATO	North Atlantic Treaty Organization
NAVSEA	Naval Sea Systems Command
NBC	Nuclear, Biological, and Chemical
NBCRV	Nuclear, Biological, and Chemical Reconnaissance Vehicle
NBIC	Nanotechnology, Biotechnology, Information Technology, and Cognitive Sciences
NCR	National Capital Region
NGB	National Guard Bureau
NHP	Non-Human Primate
NIAID	National Institute of Allergy and Infectious Diseases
NIH	National Institutes of Health
NIMS	National Incident Management System
NMRC	Naval Medical Research Center
NMSCWMD	National Military Strategy to Combat Weapons of Mass Destruction
NRT	Near-Real-Time
NSCWMD	National Strategy to Combat Weapons of Mass Destruction
NSTM	Naval Ships' Technical Manual
NTA	Non-Traditional Agent
NTNF	National Technical Nuclear Forensics
NVG	Night Vision Goggles

O

O&S	Operations and Sustainment
OASD(HA)	Office of the Assistant Secretary of Defense for Health Affairs
OATSD(NCB/CB)	Office of the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs/Chemical and Biological Defense
OCONUS	Outside of the Continental United States
OGA	Other Government Agency
OP	Organophosphonate
OPCW	Organisation for the Prohibition of Chemical Weapons
OSD	Office of the Secretary of Defense
OTA	Operational Test Agency

P

PA	Project Agreement
PAC	Portfolio Advisorty Committee
PAIO	Program Analysis and Integration Office
PBR	Physical Basic Research
PD-TESS	Product Director for Test Equipment, Strategy, and Support
PHD	Predicting Health and Disease
PI	Principle Investigator
PM	Program Manager
PME	Professional Military Education
PO	Program Office
POM	Program Objective Memorandum
POR	Program of Record
PPBE	Planning, Programming, Budget, and Execution

Q

QDR	Quadrennial Defense Review

R

R&D	Research and Development
RAHA	Rapid Altitude and Hypoxia Acclimatization
RDA	Research, Development, and Acquisition
RDT&E	Research, Development, Test, and Evaluation
ROI	Return on Investment
RSDL	Reactive Skin Decontamination Lotion
RTO	Research and Technology Organization
RVA	Rapid Vaccine Assessment

S

S&T	Science and Technology
SaaS-G	Soldier as a System-Ground
SC/CS-09	Exercise SOLID CURTAIN/CITADEL SHIELD '09
SCC-WMD	USSTRATCOM Center for Combating Weapons of Mass Destruction
SME	Subject Matter Expert
SNaP	Select and Native Programming
SNS	Strategic National Stockpile
SoS	System of Systems
SRF	Sample Receipt Facility
SSA	Software Support Activity
STM	Science and Technology Manager
SUPCOM	20th Support Command

T

T&E	Test and Evaluation
T&R	Training and Readiness
TACOM LCMC	TACOM Life Cycle Management Command
TAS	Threat Agent Science
TAV	Total Asset Visibility
TECMIPT	Test and Evaluation Capabilities and Methodologies Integrated Process Team
TEI	Technical Equipment Inspection
TESWG	Test, Evaluation, and Simulation Working Group
TIC	Toxic Industrial Chemical
TIIS	T&E Infrastructure Investment Strategy
TIM	Toxic Industrial Material
TMTI	Transformational Medical Technologies Initiative
TOP	Test Operations Procedures
TP	Technical Panel
TQR	Transition Quarterly Review
TRL	Technology Readiness Level
TRMC	Test Resource Management Center
TS	Technical Secretariat
TTA	Technology Transition Agreement
TTCP	The Technical Cooperation Program
TTI	Time Temperature Indicator
TTP	Tactics, Techniques, and Procedures
TTX	Table-Top Exercise

U

U.S.C.	United States Code
USACBRNS	United States Army Chemical, Biological, Radiological, and Nuclear School
USAMANSCEN	United States Army Maneuver Support Center
USAMRIID	United States Army Research Institute for Infectious Diseases
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USEUCOM	U.S. European Command
USNORTHCOM	U.S. Northern Command
USPACOM	U.S. Pacific Command
USSOCOM	U.S. Special Operations Command
USSOUTHCOM	U.S. Southern Command
USSTRATCOM	U.S. Strategic Command
USTRANSCOM	U.S. Transportation Command

V

VCT	Virtual Crew Trainer
VEE	Venezuelan Equine Encephalitis

W

WMD	Weapons of Mass Destruction
WMD-E	Weapons of Mass Destruction-Elimination
WSLAT	Whole System Live Agent Testing

X

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Y

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Z

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DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA
DEPARTMENT OF DEFENSE
CBDP
CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM